Model Place Value Relationships

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Model the 10-to-1 relationship among place-value positions in the base-ten number system.

Essential Question

How can you describe the value of a digit?

Materials

- MathBoard
- base-ten blocks
- Math Journal
- Animated Math Models
- *i*Tools Base-Ten blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to describe the value of a digit using the relationship among place value positions in the base-ten number system. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of place value to develop sound mathematical practices by asking these questions.

- *Why are base-ten blocks good for modeling place value?*
- *What conclusions can you draw from your place-value models?*
- *How would you change your model if you were asked to show 2; 20; 200; 2,000; and 20,000?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these place value concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 9, 12, 13 or 14–16

4 Summarize Approximately 5 min.

Essential Question

How can you describe the value of a digit?

It is ten times the value of the digit to the right.

Math Journal

How does a digit in the ten thousands place compare to a digit in the thousands place?

Read and Write Numbers

Instructional Time: 1 day

Note: The instructional time for this lesson can also be 2 days. Use the extra time to complete Unlock the Problem on page 12 as a class.

Common Core Standard

CC.4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Lesson Objective

Read and write whole numbers in standard form, word form, and expanded form.

Essential Question

How can you read and write numbers though hundred thousands?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- Real World Video, Ch. 1
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to express the value of whole numbers in different forms. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of whole numbers to develop sound mathematical practices by asking these questions.

- *What kinds of situations would it be better to use word form or expanded form instead of standard form?*
- *Do the numbers represent the same value when written in different forms?*
- *How do you know which digit has the greatest value in a number?*
- *What math vocabulary word describes each set of three digits?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these whole number concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12–15, 18

4 Summarize Approximately 5 min.

Essential Question

How can you read and write numbers through hundred thousands?

I can use digits to read and write the standard form, use word names to write the word form, or use the total value of each digit as addends to read and write the expanded form.

Math Journal

Is *70 thousand* written in standard form or word form? Explain.

Compare and Order Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Lesson Objective

Compare and order whole numbers based on the values of the digits in each number.

Essential Question

How can you compare and order numbers?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Base-Ten Blocks
- Animated Math Models

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to compare and order whole numbers by using a place-value chart and the number line. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of whole numbers to develop sound mathematical practices by asking these questions.

- *What is the problem asking?*
- *What did you do first? Why?*
- *What do you do if the two leftmost digits are the same?*
- *What do you do if the two numbers you are comparing have different numbers of digits?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these comparison concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 15–19 or 20–23

4 Summarize Approximately 5 min.

Essential Question

How can you compare and order numbers?

To compare and order numbers, I start with the digits in the greatest place-value position and compare the digits in the same place-value position.

Math Journal

Suppose the leftmost digits of two numbers are 8 and 3. Can you tell which number is greater? Explain.

Round Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.

Lesson Objective

Round a whole number to any place.

Essential Question

How can you round numbers?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to round a whole number to any place using the number line and place value. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of rounding whole numbers to develop sound mathematical practices by asking these questions.

- *Will using the number line method always work? How do you know?*
- *How do you know your answer is reasonable?*
- *What other model could you use to solve the problem?*
- *What strategy could make the problem easier?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these rounding concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 10, 11, 12

4 Summarize Approximately 5 min.

Essential Question

How can you round numbers?

I can use a number line or place value to determine whether to round to a greater number or lesser rounding number.

Math Journal

Jessie says to round 763,400 to the nearest ten thousand, he will round to 770,000. Is he right? Explain.

Investigate • Rename Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Also CC.4.NBT.2

Lesson Objective

Rename whole numbers by regrouping.

Essential Question

How can you rename a whole number?

Materials

- MathBoard
- base-ten blocks
- Math Journal
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use regrouping to rename numbers. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of whole numbers and regrouping to develop sound mathematical practices by asking these questions.

- *Why are base-ten blocks good for modeling numbers?*
- *What conclusions can you draw from your base-ten block model?*
- *How would your model change if you were asked to show 2,200 two ways?*

3 Practice

Share and Show Approximately 20 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Students can begin independent practice once they understand these whole number concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 7–10

4 Summarize Approximately 5 min.

Essential Question

How can you rename a whole number?

I can draw quick pictures of base-ten blocks or a place-value chart to help me rename numbers.

Math Journal

Explain how you can rename 5,400 as hundreds. Include a quick picture or a place-value chart in your explanation.

Add Whole Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Also CC.4.NBT.3, CC.4.OA.3

Lesson Objective

Add whole numbers and determine whether solutions to addition problems are reasonable.

Essential Question

How can you add whole numbers?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to add whole numbers and use estimation to tell whether an answer is reasonable. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of whole number addition to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to this one?*
- *What did you do first? Why?*
- *Will that method always work? How do you know?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these addition and estimation concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11–13 or 14–16

4 Summarize Approximately 5 min.

Essential Question

How can you add whole numbers?

I can align the digits by place value, and then add from right to left, regrouping when necessary to find the sum.

Math Journal

Have students write a story problem that can be solved by finding the sum of 506,211 and 424,809. Then have them solve the problem.

Subtract Whole Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.1 Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Also CC.4.NBT.3, CC.4.OA.3

Lesson Objective

Subtract whole numbers and determine whether solutions to subtraction problems are reasonable.

Essential Question

How can you subtract whole numbers?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Base-Ten Blocks
- Animated Math Models

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to estimate and subtract whole numbers, then use addition to check the answer. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of whole number subtraction to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to this one?*
- *What do you do first? Why?*
- *Will that method always work? How do you know?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these subtraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12–14 or 15–17

4 Summarize Approximately 5 min.

Essential Question

How can you subtract whole numbers?

I can align the digits by place value, then subtract from right to left regrouping when necessary to find the difference.

Math Journal

Have students write a story problem that can be solved by finding the difference of 432,906 and 61,827. Then have them solve the problem.

Problem Solving • Comparison Problems with Addition and Subtraction

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Lesson Objective

Use the strategy *draw a diagram* to solve comparison problems with addition and subtraction.

Essential Question

How can you use the strategy *draw a diagram* to solve comparison problems with addition and subtraction?

Materials

- MathBoard
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information to solve addition and subtraction comparison problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of comparison to develop sound mathematical practices by asking these questions.

- *Which operation did you choose to represent the situation?*
- *Why does that operation represent the situation?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these addition and subtraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 6, 7

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *draw a diagram* to solve comparison problems with addition and subtraction?

When I have an addition or subtraction comparison problem to solve, I can draw a bar model to represent the situation.

Math Journal

Write a comparison problem you can solve using addition or subtraction. Draw a bar model to represent the situation. Describe how the information in the bar model is related to the problem.

Algebra •

Multiplication Comparisons

Instructional Time: 1 day

Common Core Standard

CC.4.OA.1 Interpret a multiplication equation as comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

Lesson Objective

Relate multiplication equations and comparison statements.

Essential Question

How can you model multiplication comparisons?

Materials

- MathBoard
- Math Journal
- *i*Tools: Counters

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to compare quantities. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *Why is a bar model a good model for this problem?*
- *What conclusions can you make from your model?*
- *What operation did you use to represent the situation?*
- *Why does that operation represent the situation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8, 10, 11

4 Summarize Approximately 5 min.

Essential Question

How can you model multiplication comparisons?

I can use a bar model to represent the two quantities being compared. For example, $16 = 2 \times 8$ means 16 is 2 times as many as 8. The model shows a single box with 8 inside next to two boxes with 8 inside.

Algebra • Comparisons Problems

Instructional Time: 1 day

Common Core Standard

CC.4.OA.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.

Lesson Objective

Solve problems involving multiplicative comparison and additive comparison.

Essential Question

How does a model help you solve a comparison problem?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools Counters

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to solve comparison problems that are multiplicative and additive. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of addition and multiplication to develop sound mathematical practices by asking these questions.

- *Why is a bar model a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How would you change your model if Evan's dog weighed ten times as much?*
- *How would you change your model if Evan's dog weighed three times as much?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these comparison concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 4, 5, 7 or 8–10

4 Summarize Approximately 5 min.

Essential Question

How does a model help you solve a comparison problem?

A bar model helps you visualize the amounts that are being compared and helps you decide if you need to multiply or subtract to solve.

Math Journal

Write a problem involving *how much more than* and solve it. Explain how drawing a diagram helped you solve the problem.

Multiply Tens, Hundreds, and Thousands

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Also CC.4.NBT.1

Lesson Objective

Multiply tens, hundreds, and thousands by whole numbers through 10.

Essential Question

How does understanding place value help you multiply tens, hundreds, and thousands?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Base-Ten Blocks
- *i*Tools: Number Charts
- *i*Tools: Number Lines

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to multiply tens, hundreds, and thousands by whole numbers. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *What operation did you use to represent the situation?*
- *Why does that operation represent the situation?*
- *Why is the quick picture a good model for this problem?*
- *How would you change your model if there were 6 cars on the train?*
- *What strategy could you use to make your calculation easier?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 15, 16, 17

4 Summarize Approximately 5 min.

Essential Question

How does understanding place value help you multiply tens, hundreds, and thousands?

Math Journal

Explain how finding 7×20 is similar to finding $7 \times 2{,}000$. Then find each product.

Estimate Products

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Also CC.4.NBT.3

Lesson Objective

Estimate products by rounding and determine if exact answers to multiplication problems are reasonable.

Essential Question

How can you estimate products by rounding and determine if exact answers are reasonable?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Number Lines

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to estimate products by rounding and tell whether exact answers to multiplication problems are reasonable. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of estimation and multiplication to develop sound mathematical practices by asking these questions.

- *Which operation did you choose? Why?*
- *How can you use a simpler problem to help you find the answer?*
- *How do you know your answer is reasonable?*
- *What is another way to solve the problem?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these estimation and multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 6, 7

4 Summarize Approximately 5 min.

Essential Question

How can you estimate products by rounding and determine if exact answers are reasonable?

One way is to round the greater factor to the nearest higher place and then multiply using mental math.

Math Journal

Describe a real-life multiplication situation for which an estimate makes sense.

Investigate • Multiply Using the Distributive Property

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use the Distributive Property to multiply a 2-digit number by a 1-digit number.

Essential Question

How can you use the Distributive Property to multiply a 2-digit number by a 1-digit number?

Materials

- MathBoard
- grid paper
- color pencils
- base-ten blocks
- Math Journal
- Animated Math Models
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use the Distributive Property to break apart numbers and make them easier to multiply. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of the Distributive Property to develop sound mathematical practices by asking these questions.

- *Why is a rectangle a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How would your model change if you were multiplying 13 × 6?*
- *Why can you use the Distributive Property to solve this problem?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercise below requires higher order thinking skills and critical reasoning, making it especially rich.

Exercise 19

4 Summarize Approximately 5 min.

Essential Question

How can you use the Distributive Property to multiply a 2-digit number by a 1-digit number?

The Distributive Property lets me break apart the greater number as a sum of two lesser numbers. Then I can multiply each of the two lesser numbers by the 1-digit factor, using basic facts I know. Then I add these partial products to find the total product.

Multiply Using Expanded Form

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use expanded form to multiply a multidigit number by a 1-digit number.

Essential Question

How can you use expanded form to multiply a multidigit number by a 1-digit number?

Materials

- MathBoard
- *i*Tools: Base-Ten Blocks
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use expanded form and the Distributive Property to multiply whole numbers. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication and the Distributive Property to develop sound mathematical practices by asking these questions.

- *Why is a rectangle a good model for this problem?*
- *How would your model change if there was digit in the thousands place?*
- *What conclusions can you draw from your model?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 9–11 or 12–14

4 Summarize Approximately 5 min.

Essential Question

How can you use expanded form to multiply a multidigit number by a 1-digit number?

I can write the greater number in expanded form. Then I can use the Distributive Property to multiply each addend by the 1-digit number and add the partial products to find the product.

Math Journal

Explain how you can find 3×584 using expanded form.

Multiply Using Partial Products

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use place value and partial products to multiply a multidigit number by a 1-digit number.

Essential Question

How can you use place value and partial products to multiply by a 1-digit number?

Materials

- MathBoard
- *i*Tools: Base-Ten Blocks
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to develop strategies to multiply a multidigit number by a 1-digit number. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *What did you do first? Why?*
- *Have you solved a problem similar to this one?*
- *How can you use a simpler problem to help you solve this one?*
- *What is a situation that could be represented by this equation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 15–18 or 19–21

4 Summarize Approximately 5 min.

Essential Question

How can you use place value and partial products to multiply by a 1-digit number?

I can break apart the greater number into thousands, hundreds, tens, and ones. Then I can multiply each part by the other factor. Finally, I can add the partial products.

Math Journal

Explain how you can find 4×754 using two different methods.

Multiply Using Mental Math

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use mental math properties to multiply a multidigit number by a 1-digit number.

Essential Question

How can you use mental math and properties to help you multiply numbers?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Measurement

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to develop mental math strategies to multiply a multidigit number by a 1-digit number. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *What did you do first? Why?*
- *Have you solved a problem similar to this one? Describe it.*
- *What properties did you use to solve the problem?*
- *Will that method always work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–16 or 17–19

4 Summarize Approximately 5 min.

Essential Question

How can you use mental math and properties to help you multiply numbers?

I can break apart a number to make numbers that are easy to multiply mentally.

Math Journal

Show how to multiply 6×298 using friendly numbers and then using properties and mental math. Write about which method you like better and why.

Problem Solving • Multistep Multiplication Problems

Instructional Time: 1 day

Common Core Standard

CC.4.OA.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 math computation and estimation strategies including rounding.

Also CC.4.NBT.5

Lesson Objective

Use the *draw a diagram* strategy to solve multistep problems.

Essential Question

When can you use the *draw a diagram* strategy to solve a multistep multiplication problem?

Materials

- MathBoard
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information to solve multistep problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 7, 8

4 Summarize Approximately 5 min.

Essential Question

When can you use the *draw a diagram* strategy to solve a multistep multiplication problem?

A diagram helps me organize the information in the problem. It helps me visualize how the information in the problem is related.

Math Journal

Write a word problem that can be solved using multiplication of two-digit numbers. Solve your word problem and explain the solution.

Multiply 2-Digit Numbers with Regrouping

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use regrouping to multiply a 2-digit number by a 1-digit number.

Essential Question

How can you use regrouping to multiply a 2-digit number by a 1-digit number?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- Real World Video, Ch. 2
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to develop methods to estimate products and multiply a 2-digit number by a 1-digit number. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *Why are base-ten blocks a good model?*
- *What did you do first? Why?*
- *Will that method always work?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these estimation and multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 18, 20, 21 or 22–25

4 Summarize Approximately 5 min.

Essential Question

How can you use regrouping to multiply a 2-digit number by a 1-digit number?

I need to think of products in terms of the values of the digits. For example, to find 3×25, first I multiply the ones to get $3 \times 5 = 15$. I think of 15 as 1 ten and 5 ones. Then I multiply the tens to get 3×2 tens $= 6$ tens. I add the regrouped ten to get 75.

Multiply 3-Digit and 4-Digit Numbers with Regrouping

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use regrouping to multiply a multidigit number by a 1-digit number.

Essential Question

How can you use regrouping to multiply?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- iTools: Base-Ten Blocks
- Animated Math Models

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to estimate products and use regrouping to multiply and solve multistep problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *What did you do first? Why?*
- *Will that method always work?*
- *What properties did you use to find the answer?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these estimation and multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11–16 or 17–19

4 Summarize Approximately 5 min.

Essential Question

How can you use regrouping to multiply?

I start at the right. First I multiply the ones, then the tens, then the hundreds, and finally the thousands. I regroup when the product in any place is 10 or more. I record the regrouped number in the column above the next greater number.

Math Journal

Explain how finding 4×384 can help you find $4 \times 5{,}384$. Then find both products.

Algebra • Solve Multistep Problems Using Equations

Instructional Time: 1 day

Common Core Standard

CC.4.OA.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 math computation and estimation strategies including rounding.

Lesson Objective

Represent and solve multistep problems using equations.

Essential Question

How can you represent and solve multistep problems using equations?

Materials

- MathBoard
- HMH Mega Math
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use equations to represent and solve multistep problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *What operation did you choose to represent the situation?*
- *Why does that operation represent the situation?*
- *What could you use to help you solve the problem?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these algebra and multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 7–9 or 11

4 Summarize Approximately 5 min.

Essential Question

How can you represent and solve multistep problems using equations?

I can make models using the information given. Then I can use the models to write and solve the equations needed to solve the problem.

Math Journal

Write a word problem that could be solved by writing and solving a multistep equation. Then solve your problem.

Multiply by Tens

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Also CC.4.NBT.1

Lesson Objective

Use place value and multiplication properties to multiply by tens.

Essential Question

What strategies can you use to multiply by tens?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Number Lines
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different strategies to multiply by tens. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication properties to develop sound mathematical practices by asking these questions.

- *Have your solved a problem similar to this one? Describe it.*
- *Which operation did you use to represent the situation? Why?*
- *What properties did you use to find the answer?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–16 or 17–20

4 Summarize Approximately 5 min.

Essential Question

What strategies can you use to multiply by tens?

I can use place value, the Associative Property, a number line, and mental math.

Math Journal

Write the steps for how to use a number line to multiply a 2-digit number by 20. Give an example.

Estimate Products

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Also CC.4.NBT.3

Lesson Objective

Estimate products by rounding or by using compatible numbers.

Essential Question

What strategies can you use to estimate products?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Number Lines
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different strategies to estimate products. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of estimation and multiplication to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to this one? Describe the similarities.*
- *Which operation did you use to represent the situation?*
- *Why does that operation represent the situation?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these estimation concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 19–22 or 23–26

4 Summarize Approximately 5 min.

Essential Question

What strategies can you use to estimate products?

I can round each factor to the greatest place value or use compatible numbers.

Investigate • Area Models and Partial Products

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use area models and partial products to multiply 2-digit numbers.

Essential Question

How can you use area models and partial products to multiply 2-digit numbers?

Materials

- MathBoard
- color pencils
- Math Journal
- iTools: Number Charts
- iTools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to multiply 2-digit numbers. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *Why is a rectangle a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How can you use a simpler problem to help you find the answer?*
- *What properties did you use to find the answer?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercise below requires higher order thinking skills and critical reasoning, making it especially rich.

Exercise 9

4 Summarize Approximately 5 min.

Essential Question

How can you use area models and partial products to multiply 2-digit numbers?

I can draw an area model to find the partial products, and then add the partial products to find the final answer.

Math Journal

Describe how to model 2-digit by 2-digit multiplication using an area model.

Multiply Using Partial Products

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use place value and partial products to multiply 2-digit numbers.

Essential Question

How can you use place value and partial products to multiply 2-digit numbers?

Materials

- MathBoard
- Centimeter Grid Paper
- Math Journal
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different strategies to multiply 2-digit numbers. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *Why is a rectangle a good model for this problem?*
- *What conclusions can you draw from your model?*
- *What properties did you use to find the answer?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 18–21 or 22–25

4 Summarize Approximately 5 min.

Essential Question

How can you use place value and partial products to multiply 2-digit numbers?

I can break apart the numbers into tens and ones and multiply to find partial products, and then add the partial products.

Math Journal

Explain why it works to break apart a number by place values to multiply.

Multiply with Regrouping

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use regrouping to multiply 2-digit numbers.

Essential Question

How can you use regrouping to multiply 2-digit numbers?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Base-Ten Blocks
- *i*Tools: Number Charts

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to multiply 2-digit numbers using place value and regrouping. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *Which operation did you use to represent the situation? Why?*
- *What properties did you use?*
- *Will the method you used always work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 15, 18, 19

4 Summarize Approximately 5 min.

Essential Question

How can you use regrouping to multiply 2-digit numbers?

I can multiply the ones. Then I can rewrite the product as ones and regrouped tens. Then I can multiply the tens and add the regrouped tens to the product.

Choose a Multiplication Method
Instructional Time: 1 day

Note: The instructional time for this lesson can also be 2 days. Use the extra time for the class to use both methods to solve On Your Own exercises. Have students discuss how the methods are related and why they both yield accurate results. Ask students to explain the efficiency and ease of each method.

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Choose a method to multiply 2-digit numbers.

Essential Question

How can you find and record the products of two 2-digit numbers?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Base-Ten Blocks
- *i*Tools: Number Charts

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different methods to multiply 2-digit numbers. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *Which operation did you use to represent the situation? Why?*
- *What model could you use to help you solve the problem?*
- *What properties did you use to find the answer?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication methods. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14, 18, 19

4 Summarize Approximately 5 min.

Essential Question

How can you find and record the products of two 2-digit numbers?

I can use partial products or I can use regrouping.

Math Journal

How is multiplication using partial products different from multiplication using regrouping? How are they similar?

Problem Solving • Multiply 2-Digit Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.OA.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 math computation and estimation strategies including rounding.

Also CC.4.NBT.5

Lesson Objective

Use the strategy *draw a diagram* to solve multistep multiplication problems.

Essential Question

How can you use the strategy *draw a diagram* to solve multistep multiplication problems?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- Real World Video, Ch. 3
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information to solve multistep multiplication problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication to develop sound mathematical practices by asking these questions.

- *What did you do first? Why?*
- *Which operation did you use?*
- *Why is a bar model a good model for this problem?*
- *How does the diagram support your work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these multiplication concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 6, 7

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *draw a diagram* to solve multistep multiplication problems?

I can use an operation to find the numbers I need. Then I draw a bar model to show how the two numbers compare to each other. Then I can use the bar model to help write an equation that finds how many more one amount is than the other.

Estimate Quotients Using Multiples

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use multiples to estimate quotients.

Essential Question

How can you use multiples to estimate quotients?

Materials

- MathBoard
- *i*Tools: Number Charts
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to estimate quotients using multiples. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *What is the given problem asking?*
- *Have you solved a problem similar to this one? Describe the similarities.*
- *Why is making a list a good model for this problem?*
- *What conclusions can you draw from your model?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these estimation and division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 16–21 or 22–25

4 Summarize Approximately 5 min.

Essential Question

How can you use multiples to estimate quotients?

I can list multiples of the divisor until I find two multiples the dividend is between. The counting numbers used to find the multiples are the estimated quotients. The multiple closer to the dividend will produce the better estimate. If the list of multiples is too long, I can multiply the divisor by multiples of ten instead.

Investigate • Remainders

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use models to divide whole numbers that do not divide evenly.

Essential Question

How can you use models to divide whole numbers that do not divide evenly?

Materials

- MathBoard
- counters
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Counters

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to divide whole numbers that do not divide evenly. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *Which operation did you use to represent the situation? Why?*
- *Why is drawing a quick picture a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How would you change your model if there were 4 players?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercise below requires higher order thinking skills and critical reasoning, making it especially rich.

Exercise 18

4 Summarize Approximately 5 min.

Essential Question

How can you use models to divide whole numbers that do not divide evenly?

I can divide the total number of counters into equal groups by placing the same number of counters in each group until the number of counters left to divide is less than the divisor. The number of counters left over is the remainder.

Math Journal

Describe a real-life situation where you would have a remainder.

Interpret the Remainder

Instructional Time: 1 day

Common Core Standard

CC.4.OA.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 math computation and estimation strategies including rounding.

Also CC.4.NBT.6

Lesson Objective

Use remainders to solve the division problem.

Essential Question

How can you use remainders to solve the division problem?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Counters

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to interpret remainders in division problems in different ways. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *Which operation represents the situation? Why?*
- *What is another way to solve the given problem?*
- *How do you know your answer makes sense?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 4–6 or 7–10

4 Summarize Approximately 5 min.

Essential Question

How can you use remainders to solve the division problem?

I use remainders in different ways depending on the situation. I can write the remainder as a fraction, such as a fraction of a measurement unit. I can use a remainder as an answer when the question is how many are left over. I can add 1 to the quotient in situations when only whole-number quotients make sense and the left over amount must be accounted for. Or, I don't have to include the remainder at all when the situation only asks for the whole-number quotient.

Math Journal

Write word problems that represent each way you can use a remainder in a division problem. Include solutions.

Divide Tens, Hundreds, and Thousands

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Also CC.4.NBT.1

Lesson Objective

Divide tens, hundreds, and thousand by whole numbers through 10.

Essential Question

How can you divide numbers through thousands by whole numbers through 10?

Materials

- MathBoard
- Animated Math Models
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use basic facts and place value to divide whole numbers. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *What did you do first? Why?*
- *Have you solved a similar problem to the one given? Describe the similarities.*
- *What properties did you use to find the answer?*
- *Will the method you used always work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 16, 18, 21 or 23–25

4 Summarize Approximately 5 min.

Essential Question

How can you divide numbers through thousands by whole numbers through 10?

First, identify the basic fact, and then use place value to divide.

Math Journal

Explain how your knowledge of place value helps you divide a number in the thousands by whole numbers through 10. Give an example to support your explanation.

Estimate Quotients Using Compatible Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use compatible numbers to estimate quotients.

Essential Question

How can you use compatible numbers to estimate quotients?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Number Charts

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use compatible numbers to estimate quotients. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of estimation and division to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the one given? Describe the similarities.*
- *What did you do first? Why?*
- *Which operation did you use to represent the situation?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–16 or 17–20

4 Summarize Approximately 5 min.

Essential Question

How can you use compatible numbers to estimate quotients?

I can choose a number that is close to the dividend and easy to divide by the divisor.

Investigate • Division and the Distributive Property

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use the Distributive Property to find quotients.

Essential Question

How can you use the Distributive Property to find quotients?

Materials

- MathBoard
- color pencils
- grid paper
- base-ten blocks
- Math Journal
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to make division easier by using the Distributive Property. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *Why is a rectangle a good model for this problem?*
- *What conclusions can you draw from your model?*
- *What properties did you use to find the answer?*
- *Will this method always work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercise below requires higher order thinking skills and critical reasoning, making it especially rich.

Exercise 15

4 Summarize Approximately 5 min.

Essential Question

How can you use the distributive property to find quotients?

I can outline a rectangle on a grid to model the division problem. Then I can break apart the model into two smaller rectangles to show how the dividend can be broken apart into two addends; the sum of the two parts equals the dividend and each part can be divided by the divisor. I can then solve the two smaller division problems and add the quotients.

Investigate • Divide Using Repeated Subtraction

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use repeated subtraction and multiples to find quotients.

Essential Question

How can you use repeated subtraction and multiples to find quotients?

Materials

- MathBoard
- counters
- grid paper
- Math Journal
- Real World Video, Ch. 4
- Animated Math Models
- *i*Tools: Counters

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different strategies to find quotients. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *Will the method of repeated subtraction always work?*
- *What is another way to solve the given problem?*
- *What might be a shortcut for repeated subtraction?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8–9

4 Summarize Approximately 5 min.

Essential Question

How can you use repeated subtraction and multiples to find quotients?

I subtract the divisor from the dividend as many times as possible. I can subtract multiples of the divisor from the dividend and record my work vertically. The sum of the counting numbers I used to make the multiples is the quotient. I can also show subtraction on a number line by making jumps backward from the dividend and then counting the number of jumps.

Divide Using Partial Quotients

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use partial quotients to divide.

Essential Question

How can you use partial quotients to divide by 1-digit divisors?

Materials

- MathBoard
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use the partial quotients method of dividing. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *What did you do first? Why?*
- *What is a situation that could be represented by the given equation?*
- *How can you use a simpler problem to help you solve the problem?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12–15 or 20–24

4 Summarize Approximately 5 min.

Essential Question

How can you use partial quotients to divide by 1-digit divisors?

I can use partial quotients by choosing multiples of the divisor and subtracting from the dividend. Then I add the partial quotients together to find the quotient.

Math Journal

Explain how to use partial quotients to divide 235 by 5.

Investigate • Model Division with Regrouping

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use base-ten blocks to model division with regrouping.

Essential Question

How can you use base-ten blocks to model division with regrouping?

Materials

- MathBoard
- base ten blocks
- Math Journal
- *i*Tools: Base-Ten Blocks
- *i*Tools: Counters

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use manipulatives to model division with regrouping. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *Why are base-ten blocks a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How would you change your model if you were sharing equally among 4 classes?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 7, 8

4 Summarize Approximately 5 min.

Essential Question

How can you use base-ten blocks to model division with regrouping?

First, I would use tens blocks and ones blocks to model the dividend. I would divide the tens and regroup if necessary, and then divide the ones. I would write any leftover ones as a remainder.

Math Journal

Write a division problem that has 2-digit dividend and 1-digit divisor. Show how to solve it by drawing a quick picture.

Place the First Digit

Instructional Time: 1 day

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Use place value to determine where to place the first digit of a quotient.

Essential Question

How can you use place value to know where to place the first digit in the quotient?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Base-Ten Blocks

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use place value to find the correct quotient. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *Which operation did you use to represent the situation?*
- *Why does division represent this situation?*
- *Why are base-ten blocks a good model for this problem?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 13, 14, 16

4 Summarize Approximately 5 min.

Essential Question

How can you use place value to know where to place the first digit in the quotient?

Look at the first digit in the dividend. If it is large enough to be shared among the number of groups in the divisor, write the first digit in that place. If it is not, then regroup. If the regrouped amount can be shared, then write the first digit above the second digit of the dividend.

Math Journal

Write a division problem that will have a 2-digit quotient and another division problem that will have a 3-digit quotient. Explain how you chose the divisors and dividends.

Divide by 1-Digit Numbers

Instructional Time: 1 day

Note: The instructional time for this lesson can also be 2 days. Use the extra time for students to use different strategies to solve Unlock the Problem. Have students compare strategies, discuss how they are related, and explain why they work.

Common Core Standard

CC.4.NBT.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.

Lesson Objective

Divide multidigit numbers by 1-digit divisors.

Essential Question

How can you divide multidigit numbers and check your answers?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Algebra

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to divide multidigit numbers by 1-digit divisors. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the one given? Describe the similarities.*
- *What did you do first? Why?*
- *Will the method you used always work?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11–13 or 14–17

4 Summarize Approximately 5 min.

Essential Question

How can you divide multidigit numbers and check your answers?

I use the steps to divide, then I multiply the quotient by the divisor and add any remainder. If the result is the same as the dividend, my answer is correct.

Math Journal

Josey got an answer of 167 r4 for $3\overline{)505}$. Explain and correct Josey's error.

Problem Solving •
Multistep Division Problems

Instructional Time: 1 day

Common Core Standard

CC.4.OA.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 math computation and estimation strategies including rounding.

Also CC.4.NBT.6

Lesson Objective

Solve problems by using the strategy *draw a diagram*.

Essential Question

How can you use the strategy *draw a diagram* to solve multistep problems?

Materials

- MathBoard
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information to solve division problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of division to develop sound mathematical practices by asking these questions.

- *What did you do first? Why?*
- *What could you use to help you solve the given problem?*
- *Why is a bar model a good model for the given problem?*
- *What conclusions can you draw from you model?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these division concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 6, 8, 9

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *draw a diagram* to solve multistep problems?

I can use bar models to help me solve each step of a multistep problem.

Math Journal

Write a two-step problem that you can solve using the strategy *draw a diagram*. Explain how you can use the strategy to find the solution.

Model Factors

Instructional Time: 1 day

Common Core Standard

CC.4.OA.4 Find all factor pairs for a whole number in the range 1–100. 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. Determine whether a given whole number in the range 1–100 is prime or composite.

Lesson Objective

Find all the factors of a number by using models.

Essential Question

How can you use models to find factors?

Materials

- MathBoard
- square tiles
- grid paper
- Math Journal
- Animated Math Models
- *i*Tools: Counters
- *i*Tools: Number Charts

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to model factors of a number in different ways. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of factors to develop sound mathematical practices by asking these questions.

- *Why are rectangular arrays good models for these types of problems?*
- *What conclusions can you draw from your models?*
- *What patterns can you find in your models?*
- *Will using rectangular arrays always work for finding factors?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these factoring concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 10–12

4 Summarize Approximately 5 min.

Essential Question

How can you use models to find factors?

I can use square tiles and try to arrange the required number of tiles into rectangles.

Math Journal

Have students write the answer to the Essential Question and draw examples to explain their answer.

Factors and Divisibility

Instructional Time: 1 day

Common Core Standard

CC.4.OA.4 Find all factor pairs for a whole number in the range 1–100. 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. Determine whether a given whole number in the range 1–100 is prime or composite.

Lesson Objective

Determine whether a number is a factor of a given number.

Essential Question

How can you tell whether one number is a factor of another number?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Number Charts

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different methods to determine whether one number is a factor of another. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of factors to develop sound mathematical practices by asking these questions.

- *Which operation represents the given situation? Why?*
- *Why is a rectangular array a good model for this problem?*
- *What conclusions can you draw from your model?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these factoring methods. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11–13 or 14–16

4 Summarize Approximately 5 min.

Essential Question

How can you tell whether one number is a factor of another number?

I can use a divisibility rule to check if a number is a factor of another number.

Math Journal

Find the factors of 42. Show and explain your work, and list the factor pairs in a table.

Problem Solving • Common Factors

Instructional Time: 1 day

Common Core Standard

CC.4.OA.4 Find all factor pairs for a whole number in the range 1–100. 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. Determine whether a given whole number in the range 1–100 is prime or composite.

Lesson Objective

Solve problems by using the strategy *make a list*.

Essential Question

How can you use the *make a list* strategy to solve problems with common factors?

Materials

- MathBoard
- Math Journal
- Real World Video, Ch. 5
- *i*Tools: Number Charts

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information to solve problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of problem solving to develop sound mathematical practices by asking these questions.

- *What strategy could you use to help you solve this problem?*
- *Why is the "make a list" strategy a good choice for this problem?*
- *Will that strategy always work for finding factor pairs?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand the problem solving strategy. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 6, 8

4 Summarize Approximately 5 min.

Essential Question

How can you use the *make a list* strategy to solve problems with common factors?

I can make a list of factors for each number, and then identify the factor or factors that are on both lists.

Math Journal

Describe how making a list can help you solve a math problem. Write a problem that could be solved by making a list.

Factors and Multiples

Instructional Time: 1 day

Common Core Standard

CC.4.OA.4 Find all factor pairs for a whole number in the range 1–100. 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. Determine whether a given whole number in the range 1–100 is prime or composite.

Lesson Objective

Understand the relationship between factors and multiples, and determine whether a number is a multiple of a given number.

Essential Question

How are factors and multiples related?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- iTools: Number Charts
- Animated Math Models

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem ● Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different methods to relate factors and multiples. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of factors and multiples to develop sound mathematical practices by asking these questions.

- *What can you do if you do not know how to solve the given problem?*
- *Have you solved a problem similar to this one? Describe the similarities.*
- *How do you know that your answer is reasonable?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these number concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 17, 22, 23 or 24–28

4 Summarize Approximately 5 min.

Essential Question

How are factors and multiples related?

A factor times a factor is a product. The product is a multiple of either factor.

Math Journal

Write a word problem that can be solved by finding the numbers that have 4 as a factor.

Prime and Composite Numbers

Instructional Time: 1 day

Note: The instructional time for this lesson can also be 2 days. Use the extra time to complete Extend the Math as a class and apply students' understanding of prime and composite numbers.

Common Core Standard

CC.4.OA.4 Find all factor pairs for a whole number in the range 1–100. 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. Determine whether a given whole number in the range 1–100 is prime or composite.

Lesson Objective

Determine whether a number is a prime or composite.

Essential Question

How can you tell whether a number is prime or composite?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Counters
- *i*Tools: Number Charts

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use a grid model and divisibility rules to tell whether a number is prime or composite. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of factors to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the one given?*
- *Why are rectangular arrays good models for this problem?*
- *What conclusions can you draw from your model?*
- *How would your model change if you were comparing 12 and 24 instead of 12 and 13?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these factoring concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–17

4 Summarize Approximately 5 min.

Essential Question

How can you tell whether a number is prime or composite?

I can try to find three factors of the number. If the number has exactly two factors, I know it is a prime number. If the number has three or more factors, I know it is a composite number.

Math Journal

Describe how to decide if 94 is a prime number or composite number.

Algebra • Number Patterns

Instructional Time: 1 day

Common Core Standard

CC.4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

Lesson Objective

Generate a number pattern and describe features of the pattern.

Essential Question

How can you make and describe patterns?

Materials

- MathBoard
- color pencils
- Math Journal
- Animated Math Models
- HMH Mega Math

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to describe and use number patterns to solve problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of patterns to develop sound mathematical practices by asking these questions.

- *What is the problem asking?*
- *What model could you use to help you solve the given problem?*
- *What might be a shortcut for the finding the number in the pattern?*
- *What other patterns can you find?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these algebra and pattern concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5–7 or 8–10

4 Summarize Approximately 5 min.

Essential Question

How can you make and describe patterns?

I can use a rule and follow the rule to get from one term to the next term. A pattern could be described as having odd and even numbers in a certain order or the ones digits alternate.

Math Journal

Give an example of a rule for a pattern. List a set of numbers that fit the pattern.

Investigate • Equivalent Fractions

Instructional Time: 1 day

Common Core Standard

CC.4.NF.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

Lesson Objective

Use models to show equivalent fractions.

Essential Question

How can you use models to show equivalent fractions?

Materials

- MathBoard
- color pencils
- Math Journal
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to draw models to show equivalent fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and modeling to develop sound mathematical practices by asking these questions.

- *Why is a grid a good model for fractions?*
- *What conclusions can you draw from your model?*
- *How would the model change is Joe kept $\frac{1}{4}$ of his brownies?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 20 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Students can begin independent practice once they understand the concept of equivalent fractions. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 10, 12

4 Summarize Approximately 5 min.

Essential Question

How can you use models to show equivalent fractions?

I can model one fraction with same size-parts. Then, I can use different same size- parts to match the length of the first model.

Math Journal

Draw a model to show a fraction that is equivalent to $\frac{1}{3}$ and a fraction that is not equivalent to $\frac{1}{3}$.

Generate Equivalent Fractions

Instructional Time: 1 day

Common Core Standard

CC.4.NF.1 Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

Lesson Objective

Use multiplication to generate equivalent fractions.

Essential Question

How can you use multiplication to find equivalent fractions?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to connect multiplication to finding equivalent fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the one given? Describe the similarities.*
- *Why is the rectangle model good for the given problem?*
- *What conclusions can you draw from your model?*
- *How would your model change if you were working with thirds and sixths?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 7–10 or 11–13

4 Summarize Approximately 5 min.

Essential Question

How can you use multiplication to find equivalent fractions?

I multiply the numerator and denominator of a fraction by the same number.

Math Journal

Explain how you can determine if $\frac{1}{3}$ and $\frac{4}{12}$ are equivalent fractions.

Simplest Form

Instructional Time: 1 day

Common Core Standard

CC.4.NF.1 Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

Lesson Objective

Write and identify equivalent fractions in simplest form.

Essential Question

How can you write a fraction as an equivalent fraction in simplest form?

Materials

- MathBoard
- color pencils
- Math Journal
- Real World Video, Ch. 6
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to write equivalent fractions in simplest form. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *Why is a circle a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How would the model change if the cake is cut into 9 pieces?*
- *How does the drawing support your work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12, 15, 16 or 18–20

4 Summarize Approximately 5 min.

Essential Question

How can you write a fraction as an equivalent fraction in simplest form?

Common Denominators

Instructional Time: 1 day

Common Core Standard

CC.4.NF.1 Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

Lesson Objective

Use equivalent fractions to represent a pair of fractions as fractions with a common denominator.

Essential Question

How can you write a pair of fractions as fractions with a common denominator?

Materials

- MathBoard
- paper
- Math Journal
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models and multiples to find common denominators for pairs of fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *Why is paper folding a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8, 11, 12, 14 or 16–18

4 Summarize Approximately 5 min.

Essential Question

How can you write a pair of fractions as fractions with a common denominator?

I can find the multiples of the denominators and use a common multiple as a common denominator of the fractions.

Math Journal

How are a common denominator and a common multiple alike and different?

Problem Solving • Find Equivalent Fractions

Instructional Time: 1 day

Common Core Standard

CC.4.NF.1 Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $(n \times a)/(n \times b)$ 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.

Lesson Objective

Use the strategy *make a table* to solve problems using equivalent fractions.

Essential Question

How can you use the strategy *make a table* to solve problems using equivalent fractions?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information and use strategies to solve problems involving fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and problem-solving strategies to develop sound mathematical practices by asking these questions.

- *What strategy could you use to help you solve the given problem?*
- *Why are grids a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts and problem solving strategies. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 4, 6, 7

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *make a table* to solve problems using equivalent fractions?

I can draw models in a table to find equivalent fractions. I can use factors and multiples to multiply numerators and denominators to make a table of equivalent fractions.

Math Journal

Draw and compare models of $\frac{3}{4}$ of a pizza pie and $\frac{6}{8}$ of the same-size pie.

Compare Fractions Using Benchmarks

Instructional Time: 1 day

Common Core Standard

CC.4.NF.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 $\frac{1}{2}$. Recognize that comparisons are valid only when two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusion, e.g., by using a visual fraction model.

Lesson Objective

Compare fractions using benchmarks.

Essential Question

How can you benchmarks to compare fractions?

Materials

- MathBoard
- Fractions Strips
- inch ruler
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use benchmarks 0, $\frac{1}{2}$, 1 on the number line and with fraction strips to compare fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of comparing and fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *Why are fraction strips a good model for this problem?*
- *What is a different method you could use for this problem?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand using benchmarks to compare fractions. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–18 or 19–23

4 Summarize Approximately 5 min.

Essential Question

How can you use benchmarks to compare fractions?

I can use models and benchmarks on a number line to compare fractions to 0, $\frac{1}{2}$, and 1.

Math Journal

Explain a strategy you could use to compare $\frac{2}{6}$ and $\frac{5}{8}$.

Compare Fractions
Instructional Time: 1 day

Note: The instructional time for this lesson can also be 2 days. On Day 2, have students justify their responses to the On Your Own exercises, using both models and verbal reasoning.

Common Core Standard

CC.4.NF.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 $\frac{1}{2}$. Recognize that comparisons are valid only when two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusion, e.g., by using a visual fraction model.

Lesson Objective

Compare fractions by first writing them as fractions with a common numerator or a common denominator.

Essential Question

How can you compare fractions?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different methods to compare fractions and look closely at the size of the equal parts when comparing fractions with different denominators. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of comparing and fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to this one? Describe the similarities.*
- *Why is a rectangular grid a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 15–18

4 Summarize Approximately 5 min.

Essential Question

How can you compare fractions?

I can write equivalent fractions using a common denominator because the fraction with the greater numerator is the fraction with the greater value. I can write equivalent fractions using a common numerator because the fraction with the smaller denominator is the fraction with the greater value.

Compare and Order Fractions

Instructional Time: 1 day

Common Core Standard

CC.4.NF.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 $\frac{1}{2}$. Recognize that comparisons are valid only when two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusion, e.g., by using a visual fraction model.

Lesson Objective

Compare and order fractions.

Essential Question

How can you order fractions?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Number Lines
- Animated Math Models

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to order fractions with different denominators by locating them on the number line and visualizing the relationship between sizes. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and the number line to develop sound mathematical practices by asking these questions.

- *What do you remember about fractions on a number line?*
- *How could you use a number line to help you solve the problem?*
- *How could estimation help you solve the given problem?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11–13

4 Summarize Approximately 5 min.

Essential Question

How can you order fractions?

I can compare the fractions to the benchmark $\frac{1}{2}$. If two or more fractions are greater than or less than $\frac{1}{2}$, I can write equivalent fractions using a common denominator to compare the fractions. Then, I can locate the fractions on a number line to order them.

Math Journal

How is ordering fractions on a number line similar to and different from ordering whole numbers on a number line?

Investigate • Add and Subtract Parts of a Whole

Instructional Time: 1 day

Note: The instructional time for this lesson can also be 2 days. Use the extra time to discuss Extend the Math. After completing Share and Show, discuss each response and decide whether the answer is reasonable.

Common Core Standard

CC.4.NF.3a Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

Lesson Objective

Understand that to add or subtract fractions they must refer to parts of the same whole.

Essential Question

When can you add or subtract parts of a whole?

Materials

- MathBoard
- Fraction Circles
- color pencils
- Math Journal
- Animated Math Models
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to understand that you can add or subtract fractions when they refer to the same whole. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *What do you remember about writing fractions from models?*
- *Why is a fraction circle a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8, 9

4 Summarize Approximately 5 min.

Essential Question

When can you add or subtract parts of a whole?

When the parts refer to the same-size whole and the denominators are the same, I can add or subtract the parts.

Math Journal

Draw a fraction circle to model $\frac{5}{6} - \frac{1}{6}$ and write the difference.

Write Fractions as Sums

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3b Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Decompose a fraction by writing it as a sum of fractions with the same denominators.

Essential Question

How can you write a fraction a sum of fractions with the same denominator?

Materials

- MathBoard
- Math Journal
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to understand that a fraction can be expressed as the sum of unit fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *Why are fraction strips a good model for the problem?*
- *What conclusions can you draw from your model?*
- *How would your model change if the sandwich is cut into 10 equal pieces?*
- *How can you use a simpler problem to help you find the answer?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fractions concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 6–8 or 9–10

4 Summarize Approximately 5 min.

Essential Question

How can you write a fraction as a sum of fractions with the same denominator?

I can write the fraction as a sum of fractions with the same denominator. The sum of the numerators of the addends is the numerator. The denominator is the same as the denominator of the addends.

Math Journal

Write $\frac{9}{12}$ as a sum of unit fractions.

Add Fractions Using Models

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3d Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Use models to represent and find sums involving fractions.

Essential Question

How can you add fractions with like denominators using models?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different models to add fractions with like denominators. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *What do you remember about fractions with different denominators?*
- *Why is a picture a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How does the drawing support your work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12–14

4 Summarize Approximately 5 min.

Essential Question

How can you add fractions with like denominators using models?

I can use fraction strips to model each addend in a problem and then count the number of shaded parts to find the numerator of the sum. The denominator is the same as the denominator of the addends.

Math Journal

Find a recipe in a book or online that includes the amount of salt as a fraction. Model how to find the amount of salt needed when the recipe is doubled.

Subtract Fractions Using Models

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3d Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Use models to represent and find differences involving fractions.

Essential Question

How can you subtract fractions with like denominators using models?

Materials

- MathBoard
- Math Journal
- Real World Video, Ch. 7
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different models to subtract fractions with like denominators. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *Why is a rectangular grid a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 7, 11, 14

4 Summarize Approximately 5 min.

Essential Question

How can you subtract fractions with like denominators using models?

I can use a model to represent the first fraction and cross out the parts of the model that represent the second fraction. Then I can count the remaining shaded part of the model to find the difference.

Math Journal

List and describe the steps you would use to model $\frac{7}{10} - \frac{4}{10}$.

Add and Subtract Fractions

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3d Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Solve word problems involving addition and subtraction with fractions.

Essential Question

How can you add and subtract fractions with like denominators?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models and write equations to solve addition and subtraction problems with fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and modeling to develop sound mathematical practices by asking these questions.

- *What do you remember about adding fractions?*
- *What model could you use to help you solve this problem?*
- *Why are fraction strips a good model for this problem?*
- *What conclusions can you draw from your model?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 17–19, 21 or 23

4 Summarize Approximately 5 min.

Essential Question

How can you add and subtract fractions with like denominators?

Sums and differences of fractions with like denominators can be found by modeling the problem using fraction strips or by adding or subtracting the numerators and keeping the denominators the same.

Math Journal

Compare how you would model and record finding the sum and difference of two rocks weighing $\frac{2}{8}$ pound and $\frac{3}{8}$ pound.

Rename Fractions and Mixed Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3b Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Write fractions greater than 1 as mixed numbers and write mixed numbers as fractions greater than 1.

Essential Question

How can you rename mixed numbers as fractions greater than 1 and rename fractions greater than 1 as mixed numbers?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to understand the relationship between mixed numbers and fractions greater than 1. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

Have you solved a problem similar to the given problem? Describe the similarities.

- *What model could you use to help you solve the problem?*
- *What conclusions can you draw from your model?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–16 or 17–21

4 Summarize Approximately 5 min.

Essential Question

How can you rename mixed numbers as fractions greater than 1 and rename fractions greater than 1 as mixed numbers?

Math Journal

Draw and explain how you can use a number line to rename a fraction greater than 1 as a mixed number.

Add and Subtract Mixed Numbers

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3c Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Add and subtract mixed numbers.

Essential Question

How can you add and subtract mixed numbers with like denominators?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to add and subtract mixed numbers with like denominators. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions to develop sound mathematical practices by asking these questions.

- *What model could you use to help you solve this problem?*
- *Why is a fraction circle a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How does your drawing support your work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 15, 18, 19, 20 or 21–24

4 Summarize Approximately 5 min.

Essential Question

How can you add and subtract mixed numbers with like denominators?

When adding, I model both mixed numbers. I add the fractions first and then the whole numbers. Then I rename if I have to. When subtracting, I model the first mixed number and cross out the value of the second mixed number.

Math Journal

Describe how adding and subtracting mixed numbers can help you with recipes.

Subtraction with Renaming

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3d Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Rename mixed numbers to subtract.

Essential Question

How can you rename a mixed number to help you subtract?

Materials

- MathBoard
- Animated Math Models
- Math Journal
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models and renaming to subtract mixed numbers with like denominators. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and subtraction to develop sound mathematical practices by asking these questions.

- *What do you remember about renaming mixed numbers as fractions?*
- *What model could you use to help you solve the given problem?*
- *Would you need to rename the mixed number if you were adding instead of subtracting?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction and subtraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12–15 or 16–19

4 Summarize Approximately 5 min.

Essential Question

How can you rename a mixed number to help you subtract?

I can rename the mixed the number as a lesser whole number and a fraction greater than 1.

Math Journal

Explain when you know you need to rename a mixed number to subtract.

Algebra • Fractions and Properties of Addition

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3c Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Use the properties of addition to add fractions.

Essential Question

How can you add fractions with like denominators using the properties of addition?

Materials

- MathBoard
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to apply the properties of addition to add fractions with like denominators. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of addition properties and fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to this one? Describe the similarities.*
- *How can you use a simpler problem to help you find the answer?*
- *What properties did you use to find the answer?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these addition and fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12, 14, 15 or 17

4 Summarize Approximately 5 min.

Essential Question

How can you add fractions with like denominators using the properties of addition?

I can use the Commutative and Associative Properties of Addition to change the order and grouping of the addends so the mixed numbers whose fractions have a sum of 1 are next to each other or added first.

Math Journal

Describe how the Commutative and Associative Properties of Addition can make adding mixed numbers easier.

Problem Solving • Multistep Fraction Problems

Instructional Time: 1 day

Common Core Standard

CC.4.NF.3d Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. 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.

Lesson Objective

Use the strategy *act it out* to solve multistep fraction problems.

Essential Question

How can you use the strategy *act it out* to solve multistep problems with fractions?

Materials

- MathBoard
- Fraction Circles
- Math Journal
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information and use problem-solving strategies to solve multistep fraction problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and problem solving to develop sound mathematical practices by asking these questions.

- *What strategy could you use to help you solve the given problem?*
- *What did you do first? Why?*
- *Why are fraction circles a good model for this problem?*
- *What conclusions can you draw from your model?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts and problem-solving strategies. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 6, 8

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *act it out* to solve multistep problems with fractions?

I can identify what I know, what I need to find, and then choose a model to use to act out the problem, like fraction strips or circles. Then I can draw my model and use it to solve the problem.

Math Journal

Write a word problem that involves adding or subtracting two fractions. Draw a model and describe how you would act out the problem to solve it.

Multiples of Unit Fractions

Instructional Time: 1 day

Common Core Standard

CC.4.NF.4a Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$.

Lesson Objective

Write a fraction as a product of a whole number and a unit fraction.

Essential Question

How can you write a fraction as a product of a whole number and a unit fraction?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to connect the relationship between whole-number multiplication and repeated addition with fraction multiplication and repeated addition. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of operations and fractions to develop sound mathematical practices by asking these questions.

- *What do you remember about multiplication and repeated addition?*
- *Which operation do you think represents the given situation?*
- *What properties did you use to find the answer?*
- *How can a drawing support your work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts and relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11, 13, 15 or 17

4 Summarize Approximately 5 min.

Essential Question

How can you write a fraction as a product of a whole number and a unit fraction?

I can write the fraction as a sum of repeated unit fractions. Then I can use multiplication to show the repeated addition; it is the product of the repeated unit fractions and the unit fraction.

Math Journal

Explain how to write $\frac{5}{3}$ as a product of a whole number and a unit fraction.

Multiples of Fractions

Instructional Time: 1 day

Common Core Standard

CC.4.NF.4b Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Understand multiple of *a/b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number.

Also CC.4.NF.4c

Lesson Objective

Write a product of a whole number and a fraction as a product of a whole number and a unit fraction.

Essential Question

How can you write a product of a whole number and a fraction as a product of a whole number and a unit fraction?

Materials

- MathBoard
- Math Journal
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different models to understand rewriting the product of whole number and a fraction as the product of a whole number and a unit fraction. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication and fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *Why are fraction strips a good model for this problem?*
- *What conclusions can you draw from your model?*
- *What strategy could you use to make the calculation easier?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11, 12, 14

4 Summarize Approximately 5 min.

Essential Question

How can you write a product of a whole number and a fraction as a product of a whole number and a unit fraction?

If you have $4 \times \frac{3}{4}$, for example, write the fraction $\frac{3}{4}$ as a product of a whole number and a unit fraction: $3 \times \frac{1}{4}$. Then multiply $3 \times \frac{1}{4}$ by 4 to get the product of a whole number and a unit fraction: $4 \times 3 \times \frac{1}{4} = 12 \times \frac{1}{4}$.

Math Journal

Explain how to write $3 \times \frac{3}{8}$ as the product of a whole number and a unit fraction.

Multiply a Fraction by a Whole Number Using Models

Instructional Time: 1 day

Common Core Standard

CC.4.NF.4b Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Understand multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$, and use this understanding to multiply a fraction by a whole number.

Also CC.4.NF.4c

Lesson Objective

Use a model to multiply a fraction by a whole number.

Essential Question

How can you use a model to multiply a fraction by a whole number?

Materials

- MathBoard
- Animated Math Models
- Math Journal
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different strategies and models to multiply a fraction by a whole number. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of multiplication and fractions to develop sound mathematical practices by asking these questions.

- *What model could you use to help you solve the problem?*
- *Why are fraction circles a good model for this problem?*
- *What conclusions can your draw from your model?*
- *How would your model change if you were multiplying* $3 \times \frac{3}{5}$*?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 12–14

4 Summarize Approximately 5 min.

Essential Question

How can you use a model to multiply a fraction by a whole number?

Divide a whole into equal parts as shown by the denominator. Shade the number of equal parts as shown by the numerator. Show as many of these wholes as the whole-number factor. The product is the total number of shaded parts written over the denominator.

Math Journal

Explain how you can use a model to find $4 \times \frac{3}{8}$. Include a drawing and a solution.

Multiply a Fraction or Mixed Number by a Whole Number

Instructional Time: 1 day

Common Core Standard

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

Lesson Objective

Multiply a fraction by a whole number to solve a problem.

Essential Question

How can you multiply a fraction by a whole number to solve a problem?

Materials

- MathBoard
- Animated Math Models
- Math Journal
- HMH Mega Math
- Real World Video, Ch. 8

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to multiply a mixed number by a fraction, using different methods to write the mixed number as a fraction. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and equations to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *Which operation did you choose to represent the situation?*
- *Why does that multiplication represent the situation?*
- *What strategy could you use to make the calculation easier?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand operation and fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11–13 or 15–19

4 Summarize Approximately 5 min.

Essential Question

How can you multiply a fraction by a whole number to solve a problem?

Rename the mixed number as a fraction. Then multiply the numerator in the fraction by the whole number, and write the product over the denominator. Rename the product as a mixed number.

Math Journal

Write a word problem that you can solve by multiplying a mixed number by a whole number. Include a solution.

Problem Solving • Comparison Problems with Fractions

Instructional Time: 1 day

Common Core Standard

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

Lesson Objective

Use the strategy *draw a diagram* to solve problems with fractions.

Essential Question

How can you use the strategy *draw a diagram* to solve comparison problems with fractions?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information and use problem solving strategies to solve comparison problems with fractions. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of comparison and modeling to develop sound mathematical practices by asking these questions.

- *What do you remember about comparison problems with bar models?*
- *Why is a bar model a good model for the given problem?*
- *What conclusions can you draw from your model?*
- *How do you know you answer makes sense?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these comparison and fraction concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5–7

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *draw a diagram* to solve comparison problems with fractions?

I can draw a bar model to show how many times more one amount is than the fraction amount. Then I can use the model to help write a multiplication equation to use to solve the problem.

Math Journal

Draw a bar model that shows a pen is 4 times as long as an eraser that is $1\frac{1}{3}$ inches long.

Relate Tenths and Decimals

Instructional Time: 1 day

Common Core Standard

CC.4.NF.6 Use decimal notation for fractions with denominators 10 or 100.

Lesson Objective

Record tenths as fractions and as decimals.

Essential Question

How can you record tenths as fractions and as decimals?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Number Lines

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to relate decimals to fractions and understand decimal notation, using a place-value chart and the number line. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of the number line and place value to develop sound mathematical practices by asking these questions.

- *What do you remember about place value?*
- *Why is a rectangular bar model a good a model for this problem?*
- *What conclusions can you draw from your model?*
- *How could you use a number line to help you solve this problem?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction and decimal concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8, 10, 12, 14 or 16–20

4 Summarize Approximately 5 min.

Essential Question

How can you record tenths as fractions and as decimals?

Fractions, mixed numbers, and decimals in tenths are different representations of the same amount. Tenths can be expressed as a fraction or a decimal, such as $\frac{3}{10}$ and 0.3, $2\frac{3}{10}$ and 2.3.

Math Journal

Do 0.3 and 3.0 have the same value? Explain.

Relate Hundredths and Decimals

Instructional Time: 1 day

Common Core Standard

CC.4.NF.6 Use decimal notation for fractions with denominators 10 or 100.

Lesson Objective

Record hundredths as fractions and as decimals.

Essential Question

How can you record hundredths as fractions and as decimals?

Materials

- MathBoard
- Math Journal
- Real World Video, Ch. 9
- Animated Math Models
- HMH Mega Math
- *i*Tools: Number Lines

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to relate decimals expressed as hundredths to fractions, using a place-value chart and the number line. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of equivalency and models to develop sound mathematical practices by asking these questions.

- *Why is a grid a good model for the given problem?*
- *What conclusions can you draw from your model?*
- *What other tools could you use to help you solve the problem?*
- *How do you know the numbers are equivalent?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction and decimal relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8, 10, 13 or 14, 15, 17

4 Summarize Approximately 5 min.

Essential Question

How can you record hundredths as fractions and as decimals?

Fractions, mixed numbers and decimals in hundredths are different representations of the same amount. Hundredths can be expressed as a fraction or as a decimal, such as $\frac{3}{100}$ and 0.03, or $2\frac{3}{100}$ and 2.03.

Math Journal

Describe a situation where it is easier to use decimals than fractions, and explain why.

Equivalent Fractions and Decimals

Instructional Time: 1 day

Common Core Standard

CC.4.NF.5 Express a fraction with a denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.
Also CC.4.NF.6

Lesson Objective

Record tenths and hundredths as fractions and decimals.

Essential Question

How can you record tenths and hundredths as fractions and decimals?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to write equivalent fractions and decimals by applying the relationship they have learned between tenths and hundredths. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of equivalent fractions and modeling to develop sound mathematical practices by asking these questions.

- *What do you remember about finding equivalent fractions?*
- *Why is a grid a good model for this problem?*
- *What conclusions can you draw from your model?*
- *How do you know those numbers are equivalent?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction and decimal relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–17

4 Summarize Approximately 5 min.

Essential Question

How can you record tenths and hundredths as fractions and decimals?

I can write equivalent fractions and decimals using models or place value.

Math Journal

Write $\frac{5}{10}$ in three equivalent forms.

Relate Fractions, Decimals, and Money

Instructional Time: 1 day

Common Core Standard

CC.4.NF.6 Use decimal notation for fractions with denominators 10 or 100.

Lesson Objective

Translate among representations of fractions, decimals, and money.

Essential Question

How can you relate fractions, decimals, and money?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Measurement

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to understand the base-ten relationship among fractions, decimals and money amounts. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of decimals, fractions, and modeling to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to this one? Describe the similarities.*
- *Why is a 100 grid a good model for problems with money?*
- *What conclusions can you draw from your model?*
- *How does that drawing support your work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these fraction and decimal base-ten relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 22–23, 25

4 Summarize Approximately 5 min.

Essential Question

How can you relate fractions, decimals, and money?

I can write a money amount as a fraction or decimal. Money amounts are usually written as decimals because the cents are written as part of a dollar. Cents can also be written as fractions. Money amounts more than a dollar can be written as a mixed number.

Math Journal

Jeffrey says he has 6.8 dollars. How do you write the decimal 6.8 when it refers to money? Explain.

Problem Solving • Money

Instructional Time: 1 day

Common Core Standard

CC.4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Lesson Objective

Solve problems by using the strategy *act it out*.

Essential Question

How can you use the strategy *act it out* to solve problems that use money?

Materials

- MathBoard
- Coins
- Bills
- Math Journal
- *i*Tools: Measurement

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information and use a problem-solving strategy to solve operation problems with money amounts. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of problem-solving strategies and decimals to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *What strategy could you use to help you solve this problem?*
- *Why are coins a good model for this problem?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand operations with money amounts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 4, 5, 7

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *act it out* to solve problems that use money?

I can read the problem to see what I need to find. I can then use coins to model and act out the problem to show sharing, joining or separating the money amounts.

Math Journal

Write a money problem you can solve using sharing, joining, or separating.

Add Fractional Parts of 10 and 100

Instructional Time: 1 day

Common Core Standard

CC.4.NF.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.

Lesson Objective

Add fractions when the denominators are 10 or 100.

Essential Question

How can you add fractions when the denominators are 10 or 100?

Materials

- MathBoard
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to add fractional parts of 10 and 100, strengthening students' understanding of equivalent fractions and equivalent decimals. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of adding fractions to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *What do you remember about adding fractions?*
- *Will the method of finding a common denominator always work?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these representations of and operations with fractions and decimals. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 10, 12, 13 or 14–17

4 Summarize Approximately 5 min.

Essential Question

How can you add fractions when the denominators are 10 or 100?

I can write both fractions as fractions with a denominator of 100. Then I add the numerators and write the denominator.

Math Journal

Explain how you would use equivalent fractions to solve 0.5 + 0.10.

Compare Decimals

Instructional Time: 1 day

Common Core Standard

CC.4.NF.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.

Lesson Objective

Compare decimals to hundredths by reasoning about their size.

Essential Question

How can you compare decimals?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Fractions
- *i*Tools: Number Lines

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use the number line and place value to reason about the relative size of decimals and compare them. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of comparing and modeling to develop sound mathematical practices by asking these questions.

- *What do you remember about comparing numbers?*
- *Why is a grid a good model for the given problem?*
- *What conclusions can you draw from your model?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these decimal relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–17

4 Summarize Approximately 5 min.

Essential Question

How can you compare decimals?

I can use a decimal model to compare decimals by shading grids to show the two decimals and then determining how the decimals compare.

Math Journal

Show or describe two different ways to complete the comparison using >, <, or =: 0.26 ◯ 0.4.

Lines, Rays, and Angles

Instructional Time: 1 day

Common Core Standard

CC.4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Lesson Objective

Identify and draw point, lines, line segments, rays, and angles.

Essential Question

How can you identify and draw points, lines, line segments, rays, and angles?

Materials

- MathBoard
- paper
- straightedge
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is to introduce students to the geometric concepts of lines, rays and angles, and to learn the names of the figures. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometry to develop sound mathematical practices by asking these questions.

- *What do you remember about plane shapes?*
- *What do you remember about angles?*
- *How do you know an angle is a right angle?*
- *Why is a folded paper a good tool for classifying angles?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8, 10, 13 or 16–19

4 Summarize Approximately 5 min.

Essential Question

How can you identify and draw points, lines, line segments, rays, and angles?

Possible answer: I can use the definitions. A point is an exact location in space. A line continues in both directions without end, as shown by two arrowheads. A line segment is part of a line and has two endpoints. A ray is part of a line that has one endpoint and continues without end in the other direction, as shown by an arrowhead. An angle is formed by two rays or line segments that have the same endpoint.

Math Journal

Draw and label a figure that has 4 points, 2 rays, and 1 right angle.

Classify Triangles

Instructional Time: 1 day

Common Core Standard

CC.4.G.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.

Also CC.4.G.1

Lesson Objective

Classify triangles by the size of their angles.

Essential Question

How can you classify triangles by the size of their angles?

Materials

- MathBoard
- color pencils
- Math Journal
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to learn that triangles can be classified by the sizes of their angles, to name triangles, and be introduced to the right triangle. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometry to develop sound mathematical practices by asking these questions.

- *What do you remember about angles?*
- *What do you remember about triangles?*
- *What tool could you use to help you classify triangles?*
- *How do you know an angle is obtuse?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 6, 8 or 9–12

4 Summarize Approximately 5 min.

Essential Question

How can you classify triangles by the size of their angles?

Possible answer: I can classify a triangle by examining its angles. A right triangle has one right angle. An obtuse triangle has one obtuse angle. An acute triangle has three acute angles.

Math Journal

Draw and label an example of a right triangle, an acute triangle, and an obtuse triangle.

Parallel Lines and Perpendicular Lines

Instructional Time: 1 day

Common Core Standard

CC.4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Lesson Objective

Identify and draw parallel lines and perpendicular lines.

Essential Question

How can you identify and draw parallel lines and perpendicular lines?

Materials

- MathBoard
- straightedge
- Math Journal
- Real World Video, Ch. 10
- Animated Math Models
- HMH Mega Math
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to distinguish between intersecting and parallel lines in a plane. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometry to develop sound mathematical practices by asking these questions.

- *What do you remember about parallel and perpendicular lines?*
- *What do you remember about naming lines?*
- *How do you know if two lines are parallel?*
- *How do you know if two lines are perpendicular?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 9, 12–13 or 17–19

4 Summarize Approximately 5 min.

Essential Question

How can you identify and draw parallel lines and perpendicular lines?

Possible answer: I can use the definitions. Perpendicular lines are lines in a plane that intersect to form four right angles. Parallel lines are lines in a plane that are always the same distance apart; they never intersect.

Math Journal

Draw and label an example of two parallel lines that are perpendicular to a third line.

Classify Quadrilaterals

Instructional Time: 1 day

Common Core Standard

CC.4.G.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.

Lesson Objective

Sort and classify quadrilaterals.

Essential Question

How can you sort and classify quadrilaterals?

Materials

- MathBoard
- color pencils
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to formalize the definitions of quadrilaterals and the relationships among them. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometric shapes to develop sound mathematical practices by asking these questions.

- *What do you remember about quadrilaterals?*
- *What happens if all of the line segments do not connect?*
- *What do you remember about Venn diagrams?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5–7 or 8

4 Summarize Approximately 5 min.

Essential Question

How can you sort and classify quadrilaterals?

Possible answer: by the number of pairs of parallel sides, by the number of sides of equal length, and the number of right angles

Math Journal

Draw and label an example of each type of quadrilateral: trapezoid, parallelogram, rhombus, rectangle, and square.

Line Symmetry

Instructional Time: 1 day

Common Core Standard

CC.4.G.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.

Lesson Objective

Determine whether a figure has a line of symmetry.

Essential Question

How can you check if a shape has line symmetry?

Materials

- MathBoard
- pattern blocks
- scissors
- tracing paper
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to determine whether a shape has line symmetry. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of modeling and geometry to develop sound mathematical practices by asking these questions.

- *Why are pattern blocks a good tool for this activity?*
- *How does that drawing support your work?*
- *What happens if the two parts do not match exactly?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand this geometry concept. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 13–16

4 Summarize Approximately 5 min.

Essential Question

How can you check if a shape has line symmetry?

Possible answer: trace the shape, cut it out, fold it vertically, horizontally, or diagonally to see if two parts of the shape match up exactly. If they do match up exactly, then the shape has a line of symmetry.

Math Journal

Write a word that has line symmetry, like the word OHIO. Draw the line(s) of symmetry for each letter.

Find and Draw Lines of Symmetry

Instructional Time: 1 day

Common Core Standard

CC.4.G.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.

Lesson Objective

Identify and draw lines of symmetry in two-dimensional figures.

Essential Question

How do you find lines of symmetry?

Materials

- MathBoard
- pattern blocks Models
- straightedge
- Dot Paper (isometric and square)
- Math Journal
- Animated Math
- HMH Mega Math
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use different methods to find and draw lines of symmetry. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometry to develop sound mathematical practices by asking these questions.

- *Why is dot paper a good tool for this activity?*
- *What is another tool you could use to help you with this activity?*
- *How does the table help you in this activity?*
- *What patterns can you find in the table?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 10–13 or 17–20

4 Summarize Approximately 5 min.

Essential Question

How do you find lines of symmetry?

Possible answer: I can find lines of symmetry by folding a polygon in different ways so that the parts on either side of the fold match exactly. Then, the fold line will be a line of symmetry.

Math Journal

Draw a picture of a figure that has more than 3 lines of symmetry. Draw the lines of symmetry.

Problem Solving • Shape Patterns

Instructional Time: 1 day

Common Core Standard

CC.4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

Lesson Objective

Use the strategy *act it out* to solve pattern problems.

Essential Question

How can you use the strategy *act it out* to solve pattern problems?

Materials

- MathBoard
- pattern blocks
- counters
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Counters

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information and use a strategy to solve problems involving shape patterns. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometry and patterns to develop sound mathematical practices by asking these questions.

- *What strategy could you use to help you solve this problem?*
- *What did you do first? Why?*
- *How did you discover that pattern?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometric concepts and problem solving strategies. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5–7

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *act it out* to solve pattern problems?

Possible answer: I can use objects such as pattern blocks to model and extend the pattern. This can help me identify missing figures or the figures that come next in the pattern.

Math Journal

Find a pattern in your classroom. Describe and extend the pattern.

Investigate • Angles and Fractional Parts of a Circle

Instructional Time: 1 day

Common Core Standard

CC.4.MD.5a Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: 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 $\frac{1}{360}$ of a circle is called a "one degree angle", and can be used to measure angles.

Lesson Objective

Relate angles and fractional parts of a circle.

Essential Question

How can you relate angles and fractional parts of a circle?

Materials

- MathBoard
- Fraction Circles
- Math Journal
- *i*Tools: Geometry
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use fraction pieces to investigate how angles form a circle and to make generalizations. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometry and fractions to develop sound mathematical practices by asking these questions.

- *What do you remember about fractions?*
- *Why is an analog clock a good model for this type of problem?*
- *How would your model be different if you used a $\frac{1}{6}$ fraction piece?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 20 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 13–15

4 Summarize Approximately 5 min.

Essential Question

How can you relate angles and fractional parts of a circle?

Possible answer: I can use a fraction piece to draw an angle, and turn the piece and keep drawing angles until I reach the first angle to make a circle. I can do the same with a different-sized fraction piece.

Math Journal

Give a description of a $\frac{3}{4}$-turn of the minute hand on a clock face.

Degrees

Instructional Time: 1 day

Common Core Standard

CC.4.MD.5a Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: 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 $\frac{1}{360}$ of a circle is called a "one degree angle", and can be used to measure angles.

Also CC.4.MD.5b

Lesson Objective

Relate degrees to fractional parts of a circle by understanding that an angle that measures $n°$ turns through $\frac{n}{360}$ of a circle.

Essential Question

How are degrees related to fractional parts of a circle?

Materials

- MathBoard
- Math Journal
- *i*Tools: Geometry
- *i*Tools: Fractions

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to relate fractional parts of a circle to degree measures. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of fractions and geometry to develop sound mathematical practices by asking these questions.

- *What do you remember about fractional angles?*
- *Will using fractional parts to find the angle measure always work?*
- *How do you know?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometric concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 7, 11, 14

4 Summarize Approximately 5 min.

Essential Question

How are degrees related to fractional parts of a circle?

Possible answer: a turn through $\frac{1}{360}$ of a circle measures 1 degree.

Math Journal

Give an example from everyday life of an angle that measures 90 degrees.

Measure and Draw Angles

Instructional Time: 1 day

Common Core Standard

CC.4.MD.6 Measure angles in whole-number degrees using protractor. Sketch angles of specified measure.

Lesson Objective

Use a protractor to measure an angle and draw an angle with a given measure.

Essential Question

How can you use a protractor to measure and draw angles?

Materials

- MathBoard
- protractor
- Math Journal
- Real World Video, Ch. 11
- Animated Math Models
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use a protractor to measure angles, and draw angles with a given measure. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of geometry to develop sound mathematical practices by asking these questions.

- *What do you remember about the vertex of an angle?*
- *Will using a protractor to measure angles always work?*
- *Why is a protractor a good tool to draw angles?*
- *What would happen if the angle was larger than the protractor?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they know how to use a protractor and draw angles. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 10, 13, 14 or 15–16

4 Summarize Approximately 5 min.

How can you use a protractor to measure and draw angles?

Possible answer: align the 0° mark of the protractor with a ray. Find where the other ray intersects with the scale. To draw an angle, I first draw a ray. I align the endpoint of the ray with the center point, and the other point on the 0° mark of the protractor. Then I mark a point at the desired measure. Finally, I draw a ray from the endpoint of the ray to the point I drew.

Math Journal

Find an angle at home. Measure the angle. Record the measure. Classify the angle.

Investigate • Join and Separate Angles

Instructional Time: 1 day

Common Core Standard

CC.4.MD.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.

Lesson Objective

Determine the measure of an angle separated into parts.

Essential Question

How can you determine the measure of an angle separated into parts?

Materials

- MathBoard
- construction paper
- scissors
- protractor
- Math Journal
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to compose and decompose angles to learn that the measure of an angle equals the sum of the measures of its parts. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of angles to develop sound mathematical practices by asking these questions.

- *What do you remember about using a protractor?*
- *Why does addition represent the situation?*
- *What would happen if the angle had been cut into three parts?*
- *How does this drawing support your work?*

3 Practice

Share and Show Approximately 20 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Select other exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 6, 8

4 Summarize Approximately 5 min.

Essential Question

How can you determine the measure of an angle separated into parts?

Possible answer: I can use a protractor to measure each angle formed. I can check that the measures add up to the same amount as the angle before it was separated into parts.

Math Journal

How can you use addition and subtraction to put together and separate measures of an angle and its parts?

Problem Solving • Unknown Angle Measures

Instructional Time: 1 day

Note: The instructional time for this lesson can also be 2 days. Use the extra time to complete the entire lesson as a class.

Common Core Standard

CC.4.MD.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.

Lesson Objective

Use the strategy *draw a diagram* to solve angle measurement problems.

Essential Question

How can you use the strategy *draw a diagram* to solve angle measurement problems?

Materials

- MathBoard
- Math Journal
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use a problem-solving strategy to solve problems involving angle measurement . As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of angles and problem solving to develop sound mathematical practices by asking these questions.

- *What strategy could you use to help you solve the given problem?*
- *What did you do first? Why?*
- *Why is a bar model a good model for this problem?*
- *What conclusions can you draw from your model?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these algebra and geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 6, 8, 9

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *draw a diagram* to solve angle measurement problems?

Possible answer: I can use the relationship between the known angles and the unknown angle to draw a bar model. I can use the bar model to write an equation.

Math Journal

Give one example of when you would draw a diagram to solve an angle measurement problem.

Measurement Benchmarks

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Lesson Objective

Use benchmarks to understand the relative sizes of measurement units.

Essential Question

How can you use benchmarks to understand the relative sizes of measurement units?

Materials

- MathBoard
- HMH Mega Math
- Math Journa

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use items as benchmarks to understand relative sizes of measurement units. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of measurement to develop sound mathematical practices by asking these questions.

- *What do you remember about measurement?*
- *How do you know if the statement is reasonable?*
- *Why is a baseball bat a good benchmark?*
- *What else could you use as a benchmark for 1 inch?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these measurement concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 10–12 or 13–16

4 Summarize Approximately 5 min.

Essential Question

How can you use benchmarks to understand the relative sizes of measurement units?

Possible answer: when I know the size of one object, I can use it as a benchmark to find the sizes of other objects. For example, if I know a baseball bat is 1 yard long, I can tell that the length of a car is about 5 baseball bats long, or 5 yards long.

Math Journal

Use benchmarks to determine the customary and metric units you would use to measure the height of your house. Explain your answer.

Customary Units of Length

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Also CC.4.MD.2

Lesson Objective

Use models to compare customary units of length.

Essential Question

How can you use models to compare customary units of length?

Materials

- MathBoard
- 1-Inch Grid Paper
- scissors
- tape
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Measurement

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem ● Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to learn the relationship between customary units of length. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of measurement to develop sound mathematical practices by asking these questions.

- *What conclusions can you draw from your model?*
- *What would happen if you used $1\frac{1}{2}$ inch tiles instead?*
- *How could a table help you understand the concept?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these measurement relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 8–11 or 13

4 Summarize Approximately 5 min.

Essential Question

How can you use models to compare customary units of length?

Possible answer: I can use models, such as inch tiles, a table, or fraction strips, to show the relationship between the units being compared.

Customary Units of Weight

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Also CC.4.MD.2

Lesson Objective

Use models to compare customary units of weight.

Essential Question

How can you use models to compare customary units of weight?

Materials

- MathBoard
- color pencils
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Measurement

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to learn the relationship between customary units of weight. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of measurement to develop sound mathematical practices by asking these questions.

- *What do you remember about units of weight?*
- *What would be a good model to use for this problem?*
- *How could a table help you understand the concept?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these measurement relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 6, 8, 9 or 11

4 Summarize Approximately 5 min.

Essential Question

How can you use models to compare customary units of weight?

Possible answer: I can use models, such as a number line or a table, to show the relationship between the units being compared.

Customary Units of Liquid Volume

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Also CC.4.MD.2

Lesson Objective

Use models to compare customary units of liquid volume.

Essential Question

How can you use models to compare customary units of liquid volume?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Measurement
- Animated Math Models

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use models to learn the relationships among the customary units of measurement. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of measurement to develop sound mathematical practices by asking these questions.

- *What do you remember about liquid volume?*
- *How could a table help you understand the concept?*
- *How can you use math vocabulary in your explanation?*
- *How does your drawing support your work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these measurement relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 7–10 or 12

4 Summarize Approximately 5 min.

Essential Question

How can you use models to compare customary units of liquid volume?

Possible answer: I can use models, such as bars or a table, to show the relationship between the units being compared.

Math Journal

Write a problem that can be solved by comparing quarts and cups using a model. Include a solution. Explain why you are changing from a larger to a smaller unit.

Line Plots

Instructional Time: 1 day

Common Core Standard

CC.4.MD.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.

Also CC.4.MD.2

Lesson Objective

Make and interpret line plots with fractional data.

Essential Question

How can you make and interpret line plots with fractional data?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Graphs

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use line plots to order and count the frequency of fractional data. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of data displays to develop sound mathematical practices by asking these questions.

- *What do you remember about line plots?*
- *How could a line plot help you solve the problem?*
- *What would happen to your line plot if there were 2 buttons $\frac{2}{4}$ inches long?*
- *What is another method for solving this problem?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these data display concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 4, 5, 7

4 Summarize Approximately 5 min.

Essential Question

How can you make and interpret line plots with fractional data?

Possible answer: I order the fractions from least to greatest. Then I draw a number line and label it with those values. I draw an X over the value each time it is used, then count the Xs to see which values were used most and least.

Math Journal

Write a problem that can be solved using a line plot. Draw and label the line plot and solve the problem.

Investigate • Metric Units of Length

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Lesson Objective

Use models to compare metric units of length.

Essential Question

How can you use models to compare metric units of length?

Materials

- MathBoard
- Ruler (meter)
- scissors
- tape
- Math Journal
- Animated Math Models
- HMH Mega Math

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Investigate • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to compare and relate metric units of length. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of measurement to develop sound mathematical practices by asking these questions.

- *What do you remember about customary units of length?*
- *How can a model help you compare units?*
- *What might be a shortcut for finding the number of centimeters in 5 meters?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

Problem Solving Approximately 10 min.

Students can begin independent practice once they understand these measurement concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 13, 15, 16

4 Summarize Approximately 5 min.

Essential Question

How can you use models to compare metric units of length?

Possible answer: I can use a meter stick to find a measurement of different units: millimeters, centimeters, decimeters, or meters. Then I can compare the measurements.

Metric Units of Mass and Liquid Volume

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Also CC.4.MD.2

Lesson Objective

Use models to compare metric units of mass and liquid volume.

Essential Question

How can you use models to compare metric units of mass and liquid volume?

Materials

- MathBoard
- Animated Math Models
- Math Journal
- HMH Mega Math

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use multiplication to compare metric units of mass and liquid volume. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of measurement to develop sound mathematical practices by asking these questions.

- *What do you remember about mass and liquid volume?*
- *What model could you use to help solve the problem?*
- *Which operation did you choose to represent the situation?*
- *Why did you choose that operation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these measurement concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 6–9 or 10–14

4 Summarize Approximately 5 min.

Essential Question

How can you use models to compare metric units of mass and liquid volume?

Possible answer: for metric units of mass, I can multiply the number of kilograms by the number of grams in 1 kilogram, or 1,000. For metric units of liquid volume, I can multiply the number of liters by the number of milliliters in one liter, or 1,000.

Math Journal

Write a problem that involves changing kilograms to grams. Explain how to find the solution.

Units of Time

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Also CC.4.MD.2

Lesson Objective

Use models to compare units of time.

Essential Question

How can you use models to compare units of time?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- *i*Tools: Measurement

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to compare units of time. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of time and measurement to develop sound mathematical practices by asking these questions.

- *What do you remember about telling time?*
- *What might be a good model for comparing units of time?*
- *Which operation did you choose to represent the situation?*
- *Why did you choose that operation to represent the situation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these time measurement concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 6, 8, 9, 11

4 Summarize Approximately 5 min.

Essential Question

How can you use models to compare units of time?

Possible answer: I can draw a number line to compare days to weeks, or I can use a table to compare seconds, minutes, and hours.

Math Journal

Explain how you can prove that 3 weeks is less than 24 days.

Problem Solving • Elapsed Time

Instructional Time: 1 day

Common Core Standard

CC.4.MD.2 Use the four operations to solve problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Also CC.4.MD.1

Lesson Objective

Use the strategy *draw a diagram* to solve elapsed time problems.

Essential Question

How can you use the strategy *draw a diagram* to solve elapsed time problems?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Measurement
- Animated Math Models

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to organize information and use the number line to solve problems involving elapsed time. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of problem solving to develop sound mathematical practices by asking these questions.

- *What strategy could you use to help you solve the problem?*
- *What did you do first? Why?*
- *How does your drawing support your work?*
- *Will that method always work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these time concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 6, 8

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *draw a diagram* to solve elapsed time problems?

A time line is a diagram that helps to count the number of hours and minutes of elapsed time forward or backward from the given start or end time to find the unknown time.

Math Journal

Explain why it is important to know if a time is in the A.M. or in the P.M. when figuring out how much time has elapsed.

Mixed Measures

Instructional Time: 1 day

Common Core Standard

CC.4.MD.2 Use the four operations to solve problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Also CC.4.MD.1

Lesson Objective

Solve problems involving mixed measures.

Essential Question

How can you solve problems involving mixed measures?

Materials

- MathBoard
- Math Journal
- HMH Mega Math
- *i*Tools: Measurement
- Real World Video, Ch. 12

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to use mixed measures in addition and subtraction problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of operations and measurement to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to this one? Describe the similarities.*
- *Which operation did you choose to represent the situation?*
- *Why did you choose that operation to represent the situation?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these measurement concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 14–16, 18

4 Summarize Approximately 5 min.

Essential Question

How can you solve problems involving mixed measures?

Possible answer: I start by adding or subtracting the smaller units and then the larger units. I can regroup using the correct number of units.

Math Journal

Write a subtraction problem involving pounds and ounces. Solve the problem and show your work.

Algebra • Patterns in Measurement Units

Instructional Time: 1 day

Common Core Standard

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm, kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of smaller unit. Record measurement equivalents in a two-column table.

Lesson Objective

Use patterns to write number pairs for measurement units.

Essential Question

How can you use patterns to write number pairs for measurement units?

Materials

- MathBoard
- *i*Tools: Measurement
- Math Journal

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to identify relationships between pairs of measurement units. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of numerical relationships to develop sound mathematical practices by asking these questions.

- *How did you discover that pattern?*
- *How would the table change if you were comparing minutes and hours?*
- *What rule did you use to complete the table?*
- *How can you use math vocabulary in your explanation?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these measurement relationships. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 4, 6, 8 or 9, 10, 12

4 Summarize Approximately 5 min.

Essential Question

How can you use patterns to write number pairs for measurement units?

Possible answer: I can make a table with one column for each unit in the pair. I can list the measurements that have the same relationship in the column by units. Then I label each column with the name for that unit.

Math Journal

Draw a table to represent months and years. Explain how you labeled each column.

Perimeter

Instructional Time: 1 day

Common Core Standard

CC.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Lesson Objective

Use a formula to find the perimeter of a rectangle.

Essential Question

How can you use a formula to find the perimeter of a rectangle?

Materials

- MathBoard
- Animated Math Models
- Math Journal
- HMH Mega Math

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to transition from adding side lengths to find perimeter to using a formula. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of operations and perimeter to develop sound mathematical practices by asking these questions.

- *What do you remember about perimeter?*
- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *What might be shortcut for finding the perimeter?*
- *Will that method always work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these formulas. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 7, 8, 9

4 Summarize Approximately 5 min.

Essential Question

How can you use a formula to find the perimeter of a rectangle?

Possible answer: I can use the formula $P = (2 \times l) + (2 \times w)$ and write the known measurements for the length, l and the width, w. Then I can multiply the numbers inside the parentheses first and then add the products. Finally, I can write the answer using a measurement unit, such as yards or meters.

Math Journal

Imagine you want to put a border around a rectangular room. Summarize the steps you would use to find the length of border needed.

Area

Instructional Time: 1 day

Common Core Standard

CC.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Lesson Objective

Use a formula to find the area of a rectangle.

Essential Question

How can you use a formula to find the area of a rectangle?

Materials

- MathBoard
- Math Journal
- Animated Math Models
- HMH Mega Math
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to develop the formula for finding the area of a rectangle. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of operations and area to develop sound mathematical practices by asking these questions.

- *What do you remember about area?*
- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *What might be shortcut for finding the area?*
- *Will that method always work?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 11–13

4 Summarize Approximately 5 min.

Essential Question

How can you use a formula to find the area of a rectangle?

I can use the lengths of the base and height in the formula $A = b \times h$ and multiply to find the area in square units.

Math Journal

Think about what you would know about perimeter and area. Describe how to find the perimeter and area of your classroom.

Area of Combined Rectangles

Instructional Time: 1 day

Common Core Standard

CC.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Lesson Objective

Find the area of combined rectangles.

Essential Question

How can you find the area of combined rectangles?

Materials

- MathBoard
- grid paper
- Math Journal
- Real World Video, Ch. 13
- Animated Math Models
- HMH Mega Math
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to explore area as additive and to find the area of combined rectangles. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of area to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *How does grid paper help you solve the problem?*
- *Will that method always work?*
- *What is a different method you could use?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 7, 8

4 Summarize Approximately 5 min.

Essential Question

How can you find the area of combined rectangles?

I can divide them into smaller rectangles and use the formula $A = b \times h$ to find the area of each rectangle. Then I add the areas. Another way is to find the area of a larger rectangle and subtract the added region.

Math Journal

Write a word problem that involves combined rectangles. Include a diagram and the solution.

Find Unknown Measures

Instructional Time: 1 day

Common Core Standard

CC.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Lesson Objective

Given perimeter or area, find the unknown measure of a side of a rectangle.

Essential Question

How can you find an unknown measure of a rectangle given its area or perimeter?

Materials

- MathBoard
- *i*Tools: Geometry
- Math Journa

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to solve problems involving unknown measures in rectangles. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of modeling and formulas to develop sound mathematical practices by asking these questions.

- *Have you solved a problem similar to the given problem? Describe the similarities.*
- *How does the drawing support your work?*
- *How do you know which formula to use?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry applications. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 5, 7, 8, 9

4 Summarize Approximately 5 min.

Essential Question

How can you find an unknown measure of a rectangle given its area or perimeter?

Possible answer: if I know the area or perimeter of the rectangle and the measure of one side, I can use the area or perimeter formula with the known measures to find the unknown measure.

Math Journal

Write a problem that involves finding the unknown measure of a side of a rectangle. Include the solution.

Problem Solving • Find the Area

Instructional Time: 1 day

Common Core Standard

CC.4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Lesson Objective

Use the strategy *solve a simpler problem* to solve area problems.

Essential Question

How can you use the strategy *solve a simpler problem* to solve area problems?

Materials

- MathBoard
- Math Journal
- *i*Tools: Geometry

1 Engage Approximately 5 min.

This activity reviews prerequisite skills, establishing a common conceptual foundation for the lesson. Use evidence of students' understanding to decide how deeply to discuss.

2 Teach and Talk Approximately 20 min.

Unlock the Problem • Activity to Build Conceptual Understanding

Remember, this is the core instruction for this lesson, in which conceptual development is key. The goal of this activity is for students to analyze information and use a strategy to solve area problems. As students work through Unlock the Problem, gauge their level of understanding to make better decisions about how to progress through instruction.

Build on students' understanding of strategies and area to develop sound mathematical practices by asking these questions.

- *What strategy could you use to help you solve the problem?*
- *What did you do first? Why?*
- *How can you use a simpler problem to help you find the answer?*
- *How do you know your answer is reasonable?*

3 Practice

Share and Show Approximately 10 min.

Use the checked exercises as a diagnostic assessment. If students answer either exercise incorrectly, use RtI (Response to Intervention).

On Your Own Approximately 10 min.

Students can begin independent practice once they understand these geometry concepts and problem-solving strategies. Select exercises based on students' depth of understanding. The exercises below require higher order thinking skills and critical reasoning, making them especially rich.

Exercises 4–6

4 Summarize Approximately 5 min.

Essential Question

How can you use the strategy *solve a simpler problem* to solve area problems?

Possible answer: I can use this strategy when I am asked to find the area of a rectangle with a rectangular piece cut out of it. I can simply find the area of the large rectangle, and subtract the area of the small rectangle.

Math Journal

Suppose you painted the walls of your classroom. Describe how to find the area of the walls that are painted.