TEKSING TOWARD STAAR

MATHEMATICS ®

# PARENT GUIDE

for

# GRADE 5

# Mathematics LESSONS

# Parent Guide Contents

# TEKSING TOWARD STAAR MATHEMATICS®

## Overview

This Parent Guide was written with the goals of giving parents an overview of the lessons the students will be completing during the school year and assisting parents in helping students to understand the mathematics they are learning. The guide was designed for use by parents and other caring individuals who are interested in helping students progress in comprehension of the Texas Essential Knowledge and Skills.

The Parent Guide includes Parental Roles and Common Questions, Student Activity Sample, Problem-Solving Sample, Homework Sample, Mini-Assessment Sample, a Problem-Solving Model, Six Weeks Scope and Sequences, and Background Information for all lessons.

The universal use of calculators and computers has changed what is important in mathematics as well as what students need to know to be prepared for college and the work force. The past focus of mathematics curriculum was to practice and memorize some techniques that are no longer useful because they were isolated from their origins and their uses in the real world.

Current research on how students learn is now telling us that most students cannot learn mathematics effectively and efficiently by being asked to memorize given rules and practicing those rules for mastery of basic math skills. A report to the nation by the National Research Council entitled Everybody Counts stated, "Presentation and repetition may help students do well on some standardized tests and lower order skills, but are generally ineffective for long term learning, for higher-order thinking, and for versatile problem solving."

Students should leave grade 2 with mastery of basic addition and subtraction facts. TEKS 3.4F for Mathematics Grade 3 states: "The student is expected to recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts." Therefore, students should leave grade 3 with mastery of basic multiplication facts and corresponding division facts. The TEKS for Mathematics in grade 4 and above assume that each student has previously mastered basic addition, subtraction, multiplication and division facts.

Recent research has also impacted teaching methods. The research strongly indicates that a teacher telling and/or showing students how to "do math" has very little to do with promoting true learning. Students must construct their own understanding. Research shows that most students learn best when working in partner pairs or small groups to communicate and freely discuss important skills and concepts as they solve problems.

This curriculum is designed to reflect research, to reflect the National Council of Teachers of Mathematics (NCTM) Standards and to meet the requirements of the Texas Essential Knowledge and Skills for grades 3-8 mathematics through focusing on core concepts throughout the year. The intent of this design is to develop students' confidence in their ability to understand and use mathematics as a tool to solve problems as well as help students develop an understanding of the importance of mathematics in relation to their future world.

This curriculum is designed to be composed of many problems – some for spiraled review of skills and concepts already presented, some to help students develop an understanding of new skills and concepts, some to involve the use of hands-on mathematics, some to include other disciplines such as reading, writing, science, social studies, art, and architecture.

The design of each lesson is consistent and includes a format for delivery of instruction, student learning, problem-solving, homework, review, and assessment. Where appropriate, the use of manipulatives and technology is included in a lesson. Cooperative learning as a learning setting is utilized in each lesson.

# Curriculum Overview

## Lesson Focus

Each lesson in the Parent Guide begins with a Lesson Focus. The TEKS expectations, focus for the lesson, and STAAR expectations are included.

## Process Standards Incorporated Into Lesson

The Parent Guide includes a list of the Process Standards student expectations.

## Vocabulary for Lesson

The Parent Guide includes a list of Vocabulary words and phrases students should know and understand by the end of each lesson.

## Math Background

The Math Background for each part of a lesson is provided in the Parent Guide. Students are expected to take notes during instruction of the Math Background information in the lesson - notes will be used during the lesson - the goal is for students to record important information. Notes should be recorded in the student's own "words," "symbols," and pictures or diagrams.

## Problem-Solving

A Problem-Solving Model is located in Lesson 1 of the Parent Guide for use throughout the entire school year. This model addresses the Process Standards TEKS in Grade 4. This model will be discussed in the classroom during this lesson and a copy will be given to each student to keep in a math notebook.

A general set of Problem-Solving Questions is addressed by students as they solve the problems and during class discussion of the solution process. Each student will keep a copy of these questions in a math notebook.

Students work in pairs to complete a Problem-Solving Activity, however, each student completes and records their individual work.

## Student Activity

At least one Student Activity is included in each part of a lesson. Students work in pairs to complete a Student Activity, however, each student completes their own activity page(s). Math Notes are utilized to enable students to successfully complete the activity. If students did not take notes on material they need to complete the activity, the teacher will invite them to view the Math Background and to take more detailed notes.

## Hands-On Activity

Most lessons include at least one Hands-On Activity. Students work in pairs or groups of four for a Hands-On Activity, however, each student completes their own recording of data during the activity and questions about the activity.

## Skills and Concepts Homework

Students will be working on Skills and Concepts Homework at home. Students should use their math notes to help them with their homework. Each homework includes 5 open-ended questions.

## Mini-Assessment

A Mini-Assessment in STAAR format is given at the end of each lesson. This assessment is completed by each individual student and scored by the teacher.

## Six Weeks Review and Six Weeks Assessment

The Six Weeks Review is open-ended and will address all TEKS in the lessons. The review includes a Six Weeks Class Review and a Six Weeks Homework Review.

The Six Weeks Assessment is designed to assess all TEKS in the lessons from the six weeks. The assessment includes 20 questions.

**For additional information please contact the author via e-mail.**

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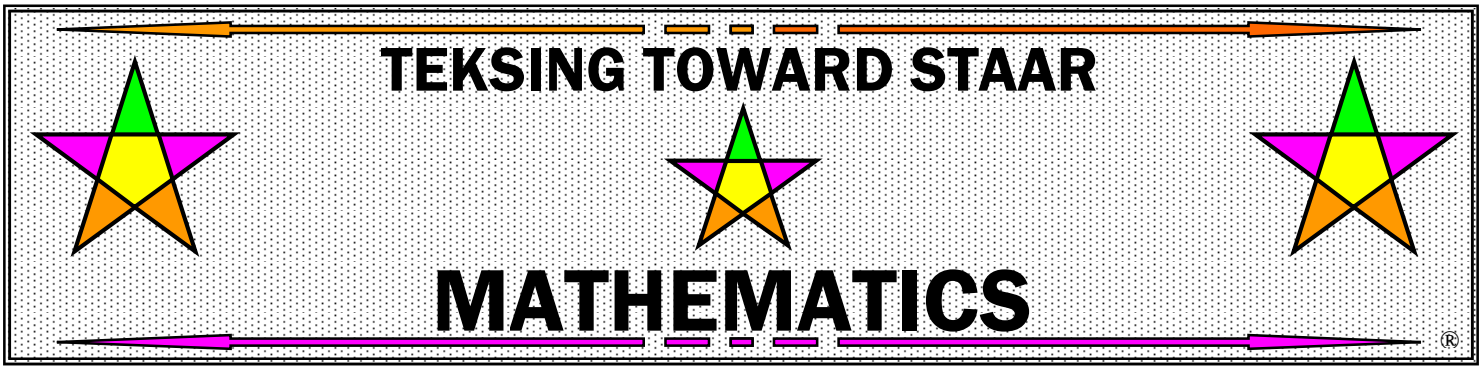


## Parental Roles, Common Questions, and Answers

As a parent, you want to do what is best for your child. Sometimes when it comes to helping your child with mathematics, you may not be sure what "best" is. When parents of Grade 5 students work to help their children, they often discover a feeling that "this is not the math I encountered as a fourth grader" and begin to ask themselves what they can do to help their child. Often, parents find it difficult to decide what is "best" when helping their child. Some of the questions parents ask include:

- *How much help should I give my child?*
- *What if I don't remember (or recognize) some of the math I learned in school?*
- *How can I help my child prepare for tests and other assessments?*
- *How can I help my child discover that math can be interesting and fun rather than frightening to my child?*
- *How do I communicate with my child's teacher to find out what my child should learn?*
- *How do I communicate with my child's teacher to find out how my child is progressing with the understanding of math?*

A successful parent often takes on many roles in the process of parenting. The following roles are involved in helping your child become the best mathematics learner possible.

**Role 1: Tutor**

As a tutor, a parent can help with the practice and memorization that are part of getting a firm grasp on many math topics. You can also help your child learn how math topics he or she may have had trouble understanding at school. The Grade 4 Scope and Sequence in this Parent Guide helps to inform parents about the lessons that will be taught each Six Weeks.

You can also help your child learn about math skills and concepts he or she may have trouble understanding and applying. This guide provides background information to help you help your child with each lesson. Your child will be taking notes at school that will include background information during each lesson. You should start by checking to make sure your child is taking good notes, then by helping your child work through the information and examples as they are presented in the background information, but you might think of another way to help your child understand that works even better.

**Role 2: Role Model**

Make your child aware of how often you use math in everyday life. Discuss situations like comparing prices in a store, balancing a checkbook, setting up a new toy, or figuring out game scores.

Share examples of times when you need to stop and think about a problem before solving it. Ask your child about the Problem-Solving Plan he or she is using in the math curriculum (the Problem-Solving Plan is included in the Parent Guide and is explained in the very first lesson of the year). Talk to your child about the fact that some of your real-world problems are harder to solve than others, and that you end up spending more time on those problems and checking your work several times in several different ways. Discuss with your child how solving a very difficult problem is very satisfying, even though it takes a lot of time and hard work.

**Role 3: Learning Facilitator**

Your child may be very independent and be able to be very successful in math without your help at home. However, you may want to check your child's work just to be sure he or she really does not need help. Be sure to question your child daily about the lesson and homework, and make sure your child begins to review for the Six Weeks Assessment by the end of the fifth week of each six weeks. Also, keep reminding your child that you are always ready to help when needed, or you will find someone else who will help.

**Role 4: Teaching Partner**

Your child's teacher spends about six hours a day, five days a week with your child. He or she probably knows your child quite well. But remember, you have been with your child a lot longer and have many more chances to work one-on-one with your child.

There may be things the teachers doesn't know about your child. Maybe your child learns better by doing an activity than by reading about math in a book, or perhaps your child learns best by listening. It is important to provide the teacher with as much information about your child as you can. It is also important for you to know what is being taught, so that you can reinforce the math curriculum at home. Remember, you and the teacher have the same goal: to help your child learn. Your role as a partner to the teacher may be as important as your role as advocate for your child.

**Role 5: Home Learning Environment Creator**

When it comes to homework, many children need a little encouragement from their parents. Help your child find a homework location at home with good lighting and near enough to you or someone else to answer questions. Find a location with no distractions (if there are distractions in the room, your child may choose to work with a soothing music CD and earphones). Make sure the location has room to spread out all the tools and supplies (for example: paper, pencils, pencil sharpener, erasers, crayons, scissors, centimeter ruler, inch ruler, a collection of button, coins or other small objects your child can use to model math problems).

Provide encouragement for your child to utilize the space on an almost daily basis. Make homework a part of your child's daily routine - after at least a 30-minute break from the school day – and long before late evening. Help your child get started and stay focused if necessary. Encourage and allow your child to take a five-minute break every 20 minutes while completing homework.

**Role 6: Homework Helper**

Homework is an extremely useful teacher and parent tool that can be used to assess a child's progress in math. Homework provides opportunities for a parent to observe a child's comfort level and understanding of math skills and concepts. Following are steps a parent can take to help their child learn the math curriculum during the school year:

Step 1: Begin by reading the background information in this guide for each lesson.
Step 2: Ask your child to review the Math Notes taken during class for this lesson.
Step 3: Review any missing or incomplete background information with your child.
Step 4: Ask your child to describe each of the 5 homework problems to you in his or her own words.
Step 5: Ask your child to describe a process that can be used to answer each problem.
Step 6: After your child has solved the homework problems, ask if there is another way each problem might be solved. Share a different way you may have thought of, but remember that the way you learned to solve similar problems may or may not help your child understand the problem. Try not to value one method that works more than another method that also works. In mathematics, there are often several good ways to solve the same problem.
Step 7: Review your child's work. Praise your child for correct answers, then ask your child to redo any of the problems that were incorrect. Ask your child to explain his or her work as each problem is reworked. If the same errors are made again, your child probably does not understand the concept and should go back to his or her Math Notes for a review.

Step 8: If your child is having difficulty understanding homework, make sure he or she makes time in the daily schedule to attend tutorials offered by the teacher or the school.

Step 9: Review the previous day's homework with your child and/or review your child's Mini-Assessment after the teacher has graded it and returned it to your child.

Step10: Immediately contact your child's teacher and request a phone or in-person conference if your child appears to have difficulty for more than 3 days, or does not bring home a homework assignment for more than 2 days, or does not share graded Mini-Assessments with you on a regular basis.

You may have questions and we will try to help you with some answers to common questions on the next several pages of this guide.

# Common Questions and Answers

The following questions from parents are very common. Following each question is a brief answer.

**Question 1: Should my child be using a calculator at school or at home?**

**ANSWER:** Students in Grade 4 should not be using a calculator in math class or while working on math homework. Students in Grade 4 are expected to come from Grade 2 with mastery of recall of basic addition and subtraction facts by memory. Students in Grade 3 are expected to recall multiplication facts and the corresponding division facts.

**The Grade 2 TEKS adopted in 2012 states the following expectations:**

"For students to become fluent in mathematics students must develop a robust sense of number. The National Research Council's report, "Adding It Up," defines procedural fluency as "skill in carrying out procedures flexibly, accurately, efficiently and appropriately." As students develop procedural fluency, they must also realize that true problem solving may take time, effort, and perseverance. Students in Grade 3 are expected to perform their work without the use of calculators."

"The student is expected to recall basic facts to add and subtract within 20 automatically."

**The Grade 3 TEKS adopted in 2012 state the following expectations:**

"For students to become fluent in mathematics students must develop a robust sense of number. The National Research Council's report, "Adding It Up," defines procedural fluency as "skill in carrying out procedures flexibly, accurately, efficiently and appropriately." As students develop procedural fluency, they must also realize that true problem solving may take time, effort, and perseverance. Students in Grade 3 are expected to perform their work without the use of calculators."

"The student is expected to recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division sentences."

**Question 2: When my child comes home from school, he or she needs a break. Then after the break it is almost impossible for my child to get started again. Often homework is done late at night or not at all. How do I help my child change?**

**ANSWER:** When children come home from school, they do need a break. Set a specified time for the break – 30 minutes should be long enough. Use a timer if you like. Then help your child get started. Allow short breaks during homework time. A five-minute break every 20 minutes works well for Grade 4 students.

Homework needs to be part of a routine. It is not always possible to have exactly the same schedule, because of outside activities, but let your child know that homework time always starts 30 minutes after getting home, or 10 minutes after dinner. If a child waits until late at night to do homework, he or she usually doesn't have the level of concentration that they need. Also, since it isn't always easy to predict how long an assignment may take, they may not finish before bedtime. If homework seems to be taking too much time, check with your child's teacher about how long it <u>should</u> be taking.

**Question 3: My child has not been given a textbook, or says he or she doesn't need to use a textbook to do homework. I'd like to help him or her review from time to time, or help him study for tests, but I am not even sure what topics or TEKS are being presented in class or have been presented in class.**

**ANSWER:** Refer to the Scope and Sequence in this guide. Your child should be able to help you identify current and past TEKS and topics presented during class. Look at the top of each homework page or lesson page your student brings home. The TEKS focus for the lesson is always listed at the top of each page.

Make sure your child is keeping Math Notes, Student Activities, Problem-Solving activites, returned homework assignments, and returned Mini-Assessments in a notebook in an organized manner. You should be able to ask your child for his math notebook at any time and review any of the material with your child. Remember to review the math background in this guide if you need to. *If you are really trying to play the role of tutor for your child, you should both be able to refer to his or her work in order to choose areas of weakness for a more focused review.*

**Question 4: Often my child rushes through the math homework and makes many careless errors, then asks me to check the homework instead of checking it himself. How can I make my child more responsible for the work?**

**ANSWER:** Try to convince your child not to rush through the homework. There are only 5 problems on the *TEKSING TOWARD STAAR* lessons homework so that students will have time to really think about the questions and do a good job completing the assignment with very few errors. Help your child understand that the teacher is giving fewer homework problems, therefore the teachers expects to see all the student's work to answer each problem, and also evidence the student has checked all answers to make sure they are accurate.

Offer to look over the homework and tell your child which problems contain errors. Your child should then check to find the incorrect answers. Eventually, your child should begin to slow down and be more careful when realizing that finding and correcting careless mistakes takes a lot more time than doing careful work in the first place.

**Question 5: My child asks for help with homework, but what is really being asked is for me to do the work. How much help should I give?**

**ANSWER:** Decide whether there is some non-math reason for your child's request for help. Your child could actually be overtired or would rather be doing something other than homework – if either of these are the case, try changing the routine homework time.

If your child really doesn't understand how to do the problem at all, first take a blank piece of paper and do the problem by yourself with your child being able to see your work as you do it (remember to refer to the background information for the lesson in this guide if you need help). Show every step and explain to your child what you are doing as you record your work. Next, remove the paper and ask your child to redo the same problem on the actual homework sheet, explaining each step to you just as you did for your child earlier.

If your child is still having difficulty, try recording the problem and your solution on another sheet of paper, this time leaving out parts of the solution. Have your child fill in the missing information.

If you child still doesn't seem to understand, work with your child to write a note to the teacher explaining the problem and promising to complete the homework assignment as soon as the teacher has time to provide additional help such as tutorials during, before and/or after school. Include all the work that you and your child did to try to solve the problem.

**Question 6: My child is very independent and doesn't want me to be involved with math homework. However, sometimes the grade given on the assignment or assessment shows that my child didn't really understand a lesson. What can I do?**

**ANSWER:** A major goal of all parents is to have a child grow into an independent adult. Don't discourage independence. A good goal is to have your child completely independent during homework time by the beginning of grade 9.

When your child finishes the homework, ask if you can check it over and ask your child to explain how one or two of the problems were solved. The explanation can help you decide if your child understands the main concepts. If your child does not want your help looking over the homework to find careless errors, then leave the finding of homework errors to the teacher. Your main concern is that your child understands the main concepts – and if you decide your child does not, then send them back to the Math Notes taken in class and review the material in this guide in the background information for the lesson.

**Question 7: What should I do if my child brings home an overwhelming amount of homework or no homework at all?**

**ANSWER:** First be sure that the homework is really intended to be done in one day. Often, teachers give assignments that are to be done over a period of a few days. If this is the case, help your child break the assignment into parts and write down which part should be completed each day.

If the assignment is intended to be done in one day, be sure your child's outside activities are not part of the problem. Next, understand that some students take longer to do certain assignments that others. Try cutting the assignment down, but be sure to include a few off each different type of problem. For example, if your child brings home a practice sheet with addition and subtraction problems, choose some of each. Then write a not to the teacher explaining that the assignment was too long for your child and that you will work with your child to complete the assignment the next night, or over the weekend.

In general, students should have a math homework assignment each day – or should be studying for the end of six weeks assessment. Communicate with your child's teacher if there appears to be a lack of homework assignments, or your child is consistently telling you that the homework was done in class.

**Question 8: Sometimes my child brings home a worksheet that has small type or not enough space to really show the work. What can I do to help my child keep from becoming frustrated when this happens?**

**ANSWER:** Sometimes worksheets can be overwhelming. Try copying the problem onto another piece of paper, leaving plenty of room for work. Sometimes having very little on a page can really help a child focus on a particular problem. Copying a problem onto a different piece of paper may also make it easier for your child to refer to examples or instructions that are not on the same side of the homework sheet as the problem. When you copy a problem, be sure your child sees you double-check that you copied it correctly. In the beginning you are acting as a role model so that eventually your child will be comfortable copying the problem. Be sure your child shows all the work they do to answer a problem.

**Question 9: My child's work is so sloppy that I sometimes think this causes completion of the problem with a wrong answer. What can I do to help?**

**ANSWER:** Try helping your child set up a paper before getting started. Figure out how much space will be needed for each problem (be generous). Fold the paper into sections. If your child has difficulty lining up the numbers when computing, try having your child use graph paper or lined notebook paper turned sideways. Also, encourage your child to slow down and take the time required for neatness

**Question 10: When my child asks me to check homework, I find many answers that are wrong. How do I decide whether my child has been careless or does not actually understand the math concepts?**

**ANSWER:** Ask your child to redo some of the problems that are wrong. If answers are correct his time, your child was probably being careless. If the same errors are made again, then your child probably does not understand the concept(s) and should go back to Math Notes or the Parent Guide for a review.

If your child successfully uses a method other than the examples given in class or in the Parent Guide, it might be a good idea to send a not to the teacher explaining why your child prefers a different method. In mathematics, there are often several good ways to solve the same problem.

**OTHER QUESTIONS???? – Please contact your child's math teacher – if the teacher can't answer your question, feel free to contact the author via e-mail:**

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# Problem-Solving Model

| Step | Description of Step |
|---|---|
| 1 | **Analyze the given information.**<br>•Summarize the problem in your own words.<br>•Describe the main idea of the problem.<br>•Identify information needed to solve the problem. |
| 2 | **Formulate a plan or strategy.**<br>•Draw a picture or a diagram.<br>•Find a pattern.<br>•Guess and check.<br>•Act it out.<br>•Create or use a chart or a table.<br>•Work a simpler problem.<br>•Work backwards.<br>•Make an organized list.<br>•Use logical reasoning.<br>•Brainstorm.<br>•Write a number sentence or an equation. |
| 3 | **Determine a solution.**<br>•Estimate the solution to the problem.<br>•Solve the problem. |
| 4 | **Justify the solution.**<br>•Explain why your solution solves the problem. |
| 5 | **Evaluate the process and the reasonableness of your solution.**<br>•Make sure the solution matches the problem.<br>•Solve the problem in a different way. |

# Problem-Solving Questions

**Directions:**

- **Work with a partner.**
- **Write your answers on notebook paper.**
- **Answer questions 1-3.**
- **Complete the solution to the problem.**
- **Answer questions 4-10.**

1. What is the main idea of this problem?

2. What are the supporting details in this problem?

3. What skills, concepts and understanding of math vocabulary are needed to be able to answer this problem?

4. Did this problem involve mathematics arising in everyday life, society, or the work place?

5. What is a good problem solving strategy for this problem?

6. Can you explain how you used any math tools, mental math, estimation or number sense to solve this problem?

7. Did this problem involve using multiple representations (symbols, diagrams, graphs, math language)?

8. Did you use any relationships to solve this problem?

9. How can you justify your solution to the problem?

10. How can you check for reasonableness of your solution to this problem?

# Problem-Solving 1

Work with a partner. Your teacher will give you and your partner 8 number cards and a decimal point card.

- Create the largest number possible using four number cards, placing the decimal point card after a 2-digit whole number, and placing the 3 card in the hundredths place.

  Write and read this number in standard and word form.

- Create the smallest number possible using four number cards, placing the decimal point after a two-digit whole number, and placing the 3 card in the thousandths place.

  Write and read this number in standard and word form.

- Write two numbers using 5 of the number cards, the decimal point after a two-digit whole number, and the 0 card in the hundredths or tenths.

  Write and read the numbers in standard form and in word form.

# Problem-Solving 2

The table below shows the lengths of several different types of sharks a marine biology class measured off the shore in Aransas Pass, Texas.

They measured to the nearest thousandth of a meter.

| Type of Shark | Length |
|---|---|
| Bonnethead | 0.923 meters |
| Blackfin | 1.784 meters |
| Sandbar | 1.567 meters |
| Blacknose | 0.984 meters |

Record the expanded notation for the length of each shark.

Record the word form for each of the lengths.

Record the value of the digit 4 in the length of the blackfin shark.

Record the value of the digit 9 in the length of the blacknose shark.

Record the value of the digit 5 in the length of the sandbar shark?

# Hands-On Activity 1

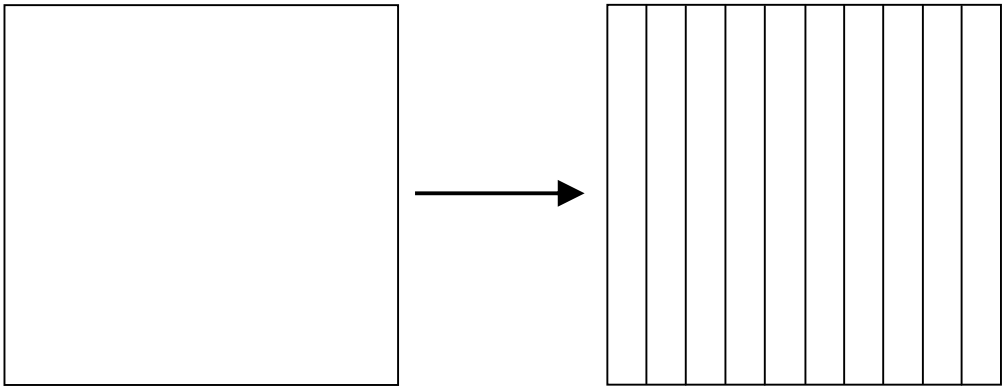
## Thinking in Thousandths

**Materials:** 3 different color pencils, meter stick, scissors, 50 cm x 50 cm white paper square (cut from butcher paper or white wrapping paper)

**Procedure:** Work in partner pairs. Decide who is Student 1 and who is Student 2.

### Part I - One Square Equally Divided Into Ten Rectangles

- Work together. You and your partner will use 1 large square, a ruler, a pencil and a color pencil.
- The large square is one whole. Use a ruler to divide 1 of your white squares into 10 equal columns. Use the straight edge and your pencil to draw lines for the column divisions. Draw each line from the top of the paper to the bottom of the paper.



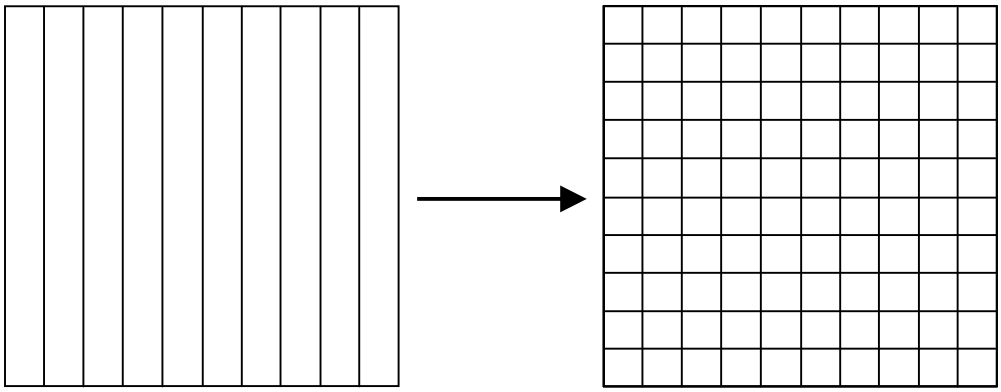
- Use a color pencil to shade 1 of the ten equal rectangles on the square.
- 1 large square represents _____ whole.
- 1 shaded rectangle represents what part of 1 large square written as a decimal? _____
- 1 shaded rectangle represents what part of 1 large square as a fraction? _____
- _____ large square was divided into _____ equal rectangles, so each rectangle is one _____ of the 1 large square.
- _____ rectangles make _____ large square, so 1 large square is ten _____ 1 rectangle.
- The value of 1 large square is _____ times the value of 1 rectangle.
- The value of a 1 rectangle is _____ of the value of 1 large square.
- If one square represents 1, then ___ rectangle represents one tenth.

$1 = \_\_\_\_ \times 0.\_\_\_$ $\qquad 1 \div 10 = \frac{1}{\square}$

$1 = 10 \times \frac{\square}{10}$ $\qquad 1 \div 10 = \_\_\_.1$

## Part II - Ten Equal Rectangles Each Divided Into Ten Equal Squares

- Work together. You and your partner will continue to use the same large square you used in Part I. You will need a regular pencil and a different color pencil from the one you used in Part I.
- Remember, the square is 1 and each rectangle is $\frac{1}{10}$ of the square.
- Now, divide each of the rectangles into 10 equal squares.



- Use a different color pencil from the one used in Part I. Shade one of the small squares.
- What is the number of small squares in 1 rectangle? _____

  What is the number of rectangles in 1 large square? _____

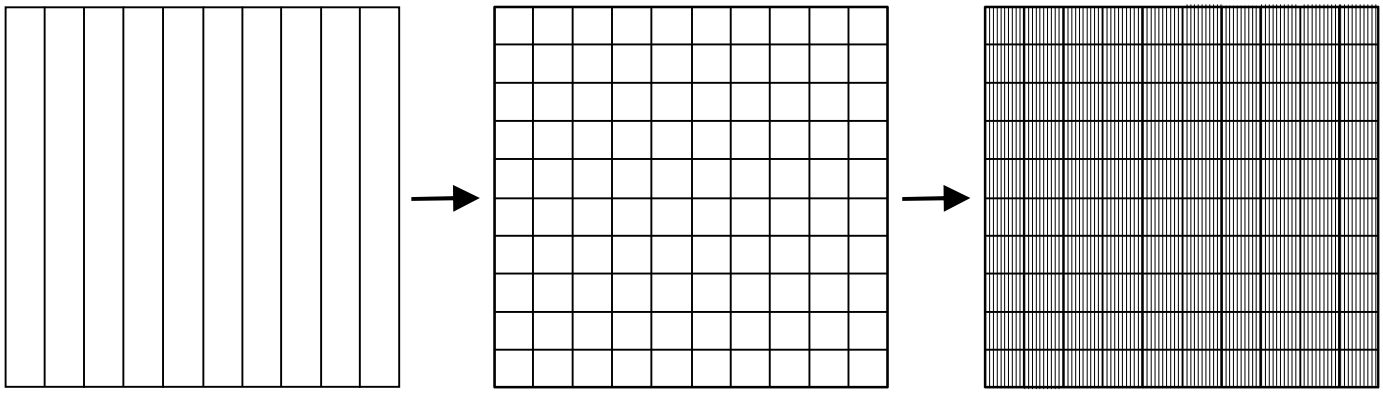
  What is the number of small squares in 1 large square? _____
- 1 large square represents _____ whole.
- 1 rectangle represents what part of the large square written as a decimal? _____
- 1 rectangle represents what part of the large square written as a fraction? _____
- The value of 1 large square is _____ times the value of 1 rectangle.
- The value of 1 rectangle is _____ of the value of 1 large square.
- 1 square represents 1, so 1 rectangle represents $\frac{1}{10}$.
- 1 small square represents what part of 1 rectangle written as a decimal? _____
- 1 small square represents what part of 1 rectangle written as a fraction? _____
- The value of 1 rectangle is _____ times the value of 1 small square.
- The value of 1 small square is _____ of the value of 1 rectangle.
- 1 rectangle represents $\frac{1}{10}$, so ___ small square represents one hundredth.

$0.1 = \_\_\_\_ \times 0.0\_\_$ $\qquad$ $0.1 \div 10 = \frac{1}{\square}$

$0.1 = 10 \times \frac{\square}{100}$ $\qquad$ $0.1 \div 10 = 0.\_\_1$

## Part III - One Hundred Equal Squares Each Divided Into Ten Equal Rectangles

- Work together. You and your partner will continue to use the same large square you used in Part I and Part II. You will need a regular pencil and a different color pencil from the ones you used in Part I and Part II.
- Remember, the large square is one whole, each rectangle is one tenth, and each small square is one hundredth.
- Now, divide each of the small squares into 10 equal rectangles. Draw your lines from top to bottom.



- Use a color pencil to shade one of the ten equal rectangles in one of the small squares. Use a different color pencil from the ones you used in Part I and Part II.
- What is the number of small squares in 1 rectangle? _____

  What is the number of large rectangles in 1 large square? _____

  What is the number of small squares in 1 large square? _____

  What is the number of small rectangles in 1 small square? _____

  What is the number of small rectangles in 1 large rectangle? _____

  What is the number of small rectangles in 1 large square? _____
- 1 large square represents _____ whole.
- The value of 1 large square is _____ times the value of 1 large rectangle.
- The value of 1 large rectangle is _____ of the value of 1 large square.
- 1 small square represents what part of 1 large rectangle written as a decimal? _____
- 1 small square represents what part of 1 large rectangle written as a fraction? _____
- The value of 1 large rectangle is _____ times the value of 1 small square.
- The value of 1 small square is _____ of the value of 1 large rectangle.
- 1 small rectangle represents what part of 1 small square written as a decimal?

  _____
- 1 small rectangle represents what part of 1 small square written as a fraction?

  _____

- The value of 1 small square is _____ times the value of 1 small rectangle.
- The value of 1 small rectangle is _____ of the value of 1 small square.
- 1 small square represents $\frac{1}{100}$, so ___ small rectangles represents one thousandth.

$0.01 = \_\_\_\_ \times 0.00\_\_$ $0.01 \div 10 = \frac{1}{\square}$

$0.01 = 10 \times \frac{\square}{1{,}000}$ $0.01 \div 10 = 0.\_\_1$

In your own words, describe the relationship between the large square, large rectangle, small square, and small rectangle.

**This model shows:**

There are _____ times as many tenths as there are ones.

There are _____ times as many hundredths are there are tenths.

There are _____ times as many thousandths as there are hundredths.

There are _____ as many ones as there are tenths.

There are _____ as many tenths as there are hundredths.

There are _____ as many hundredths as there are thousandths.

**What did you learn from this activity?**

# Student Activity 1

**Work with a partner to complete Student Activity 1.**

**PROBLEM 1:** Read the number in the place-value chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | 4 | . | 7 | 1 | 6 |

- Read the number to the _____ of the decimal point.

  Say: _____.

- Say the word _____ to represent the decimal point.
- Read the number to the _____ of the decimal point.

  Say: _____ *hundred* _____.

- Then say the place-value name of the last digit on the right, _____.

Read the number 4.716 as _____ *and* _____ *hundred sixteen*

_____.

**PROBLEM 2:** Read the number in the place-value chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 2 | 3 | . | 4 | 5 | |

- Read the number to the left of the decimal point.

  Say: _____ - _____

- Say the word *and* to represent the _____ point.
- Read the number to the _____of the decimal point.

  Say: _____ - _____

- Then say the place-value name of the _____ digit on the right, *hundredths.*

Read the number 23.45 as _____-_____ *and* _____-

_____ *hundredths.*

**PROBLEM 3:** Use place-value patterns to complete the table.

| Given Number | 10 times as much as given number | $\frac{1}{10}$ of given number |
|---|---|---|
| 2.08 | | |
| 0.37 | | |
| 5.09 | | |
| 0.16 | | |

Explain how you know your answers are correct.

**PROBLEM 4:** Read the number in the place-value chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 3 | 7 | . | 8 | 4 | |

• Read the number to the left of the decimal point.

Say: _____ - _____

• Say the word *and* to represent the _____ point.

• Read the number to the _____of the decimal point.

Say: _____ - _____

• Then say the place-value name of the last digit on the right, *hundredths.*

Read the number 37.84 as _____-_____ *and* _____-_____ *hundredths.*

**PROBLEM 5:** Use place-value patterns to complete the table.

| Given Number | 10 times as much as given number | $\frac{1}{10}$ of given number |
|---|---|---|
| 0.08 | | |
| 0.3 | | |
| 0.09 | | |
| 0.6 | | |

Explain how you know your answers are correct.

**PROBLEM 6:** Read the number in the place-value chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 9 | 1 | . | 5 | 6 | 0 |

• Read the number to the left of the decimal point.

Say: _____ - _____

• Say the word *and* to represent the _____ point.

• Read the number to the _____of the decimal point.

Say: _____ _____ _____

• Then say the place-value name of the last digit on the right, _____.

Read the number 91.560 as _____-_____ *and*

_____ _____ _____ *thousandths.*

**PROBLEM 7:** Use place-value patterns to complete the table.

| Given Number | 10 times as much as given number | $\frac{1}{10}$ of given number |
|---|---|---|
| 3.08 | | |
| 13.2 | | |
| 4.96 | | |
| 7.05 | | |

**PROBLEM 8:** Read the number in the place-value chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 9 | 4 | . | 2 | 8 | |

• Read the number to the left of the decimal point.

Say: _____ - _____

• Say the word *and* to represent the _____ point.

• Read the number to the _____of the decimal point.

Say: _____ - _____

• Then say the place-value name of the last digit on the right, _____.

Read the number 94.28 as _____ - _____ *and*

_____ - _____ _____.

**PROBLEM 9:** Read the number in the place-value chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | 7 | . | 9 | 0 | 2 |

• Read the number to the _____ of the decimal point.

Say: _____.

• Say the word _____ to represent the decimal point.

• Read the number to the _____ of the decimal point.

Say: _____ *hundred* _____.

• Then say the place-value name of the last digit on the right, _____.

Read the number 7.902 as _____ *and* _____ *hundred* _____

_____.

**PROBLEM 10:** Keisha researched the average lengths of several types of bees on the internet. She recorded the data she gathered in a table. She recorded the lengths in meters.

| Lengths of Bees (in meters) | |
|---|---|
| Leafcutting Bee | 0.014 |
| Bumblebee | 0.019 |
| Sweat Bee | |
| Carpenter Bee | 0.028 |
| Orchid Bee | 0.028 |

Keisha forgot to record the length of the sweat bee. The length of a sweat bee is 6 thousandths of a meter. Complete Keisha's table.

Keisha's art class decided to make models of each of these bees. They decided to make the length of each model 10 times the actual length of the bee. Complete the table to show the length of each model.

| Lengths of Bee Models (in meters) | |
|---|---|
| Leafcutting Bee | |
| Bumblebee | |
| Sweat Bee | |
| Carpenter Bee | |
| Orchid Bee | |

How do you know the data you recorded in the table is correct?

# Student Activity 2

**Work with a partner to complete Student Activity 2.**

**PROBLEM 1**: Write the value of 25.097 in expanded notation.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | | . | | | |

__ × ___ + __ × __ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$

The place-value chart shows the value of each digit.

- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____.
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____.
- The digit ___ is in the thousandths place so it represents ___ thousandths and has a value of _____.

The value of 25.097 in expanded notation is _____ + ___ + _____ + _____ + _____.

**PROBLEM 2**: Write the value of 50.614 in expanded notation.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | | . | | | |

__ × ___ + __ × __ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$

The place-value chart shows the value of each digit.

- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____.
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____.
- The digit ___ is in the thousandths place so it represents ___ thousandths and has a value of _____.

The value of 50.614 in expanded notation is _____ + ___ + _____ + _____ + _____.

**PROBLEM 3**: Write the value of 80.028 in expanded notation. .

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | | . | | | |

__ × ___ + __ × __ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$

The place-value chart shows the value of each digit.

- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____.
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____.
- The digit ___ is in the thousandths place so it represents ___ thousandths and has a value of _____.

The value of 80.028 in expanded notation is _____ + ___ + _____ + _____ + _____.

**PROBLEM 4**: Write the value of 12.034 in expanded notation.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | | . | | | |

__ × ___ + __ × __ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$

The place-value chart shows the value of each digit.

- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____.
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____.
- The digit ___ is in the thousandths place so it represents ___ thousandths and has a value of _____.

The value of 12.034 in expanded notation is _____ + ___ + _____ + _____ + _____.

**PROBLEM 5**: Complete the place-value chart to show the value of each digit. Follow the pattern in the chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 2 | 8 | . | 5 | 2 | 4 |
| 2 x 10 | | . | | $2 \times \frac{1}{100}$ | |
| | 8 | . | 0.5 | | 0.004 |

**PROBLEM 6**: Write the value of 7.03 in expanded notation.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | | . | | | |

__ × __ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$

The place-value chart shows the value of each digit.

- The digit ___ is in the ones place so it represents ___ one and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenth and has a value of _____.
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____.

The value of 7.03 in expanded notation is ___ + _____ + _____.

**PROBLEM 7**: Write the value of 30.051 in expanded notation.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | | . | | | |

__ × ___ + __ × __ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$

The place-value chart shows the value of each digit.

- The digit ___ is in the tens place so it represents ___ tens and has a value of ____.
- The digit ___ is in the ones place so it represents ___ ones and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenths and has a value of _____.
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____.
- The digit ___ is in the thousandths place so it represents ___ thousandths and has a value of _____.

The value of 30.051 in expanded notation is ____ + ___ + _____ + _____ + _____.

**PROBLEM 8**: Complete the table to rename 0.7 as other place values.

| | | |
|---|---|---|
| 0.**7**00 | 7 tenths | $7 \times \frac{1}{10}$ |
| 0.0**7**0 | _____ hundredths | ___ $\times \frac{1}{100}$ |
| 0.00**7** | _____ _____ | ___ $\times \frac{\square}{\square}$ |

Explain how you know your table is correct.

**PROBLEM 9**: Write the value of 89.04 in expanded notation.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| | | . | | | |

__ × ___ + __ × __ + __ × $\frac{1}{\square}$ + __ × $\frac{1}{\square}$

The place-value chart shows the value of each digit.

- The digit ___ is in the tens place so it represents ___ tens and has a value of _____.
- The digit ___ is in the ones place so it represents ___ one and has a value of ___.
- The digit ___ is in the tenths place so it represents ___ tenth and has a value of _____.
- The digit ___ is in the hundredths place so it represents ___ hundredths and has a value of _____.

The value of 89.04 in expanded notation is _____ + ___ + _____ + _____ .

**PROBLEM 10:** Complete the place-value chart to show the value of each digit. Follow the pattern in the chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 6 | 3 | . | 8 | 5 | 9 |
| | 3 x 1 | . | $8 \times \frac{1}{10}$ | | $9 \times \frac{1}{1,000}$ |
| 60 | | . | | 0.05 | |

Explain how you know your chart is correct.

NAME_____ DATE_____ SCORE ___/5

## 5.2A Skills and Concepts Homework 1

1. What is the value of the digit 3 in the number 198.356?
   How do you know your answer is correct?

2. How is six hundred fifty-five thousand, seven hundred and one hundred four thousandths written as a numeral? _____
   How do you know your answer is correct?

3. Read the number in the place-value chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 6 | 0 | . | 0 | 6 | 0 |

The number 60.060 in words is _____ *and* _____ _____.
Explain how you know your answer is correct.

4. How is twenty-eight thousand, three hundred ninety-one and thirty-two hundredths written as a numeral? _____

   How do you know your answer is correct?

5. Yasmin, Serena, and Helga played a math game. Each person chose a number. Serena's number is 10 times as much as Helga's number. Yasmin's number is 10 times as much as Serena's number. Helga's number is 0.084. What numbers did each Yasmin and Serena choose?

   Yasmin chose _____ because:

   Serena chose _____ because:

NAME_____ DATE_____ SCORE ___/5

## 5.2A Skills and Concepts Homework 2

1. Write seven and two hundred forty-three thousandths in standard form. _____
   Write this number in expanded notation.

   Explain how you know your answer is correct.

2. Write a number in standard form that has the same value as 5 + 3.0 + 0.4 + 0.001
   _____ Explain how you know your answer is correct.

3. Complete the place-value chart to show the value of each digit. Follow the pattern in the chart.

| Tens | Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|---|
| 9 | 4 | . | 6 | 1 | 3 |
| | 4 x 1 | . | | $1 \times \frac{1}{100}$ | |
| 90 | | . | 0.6 | | 0.003 |

   Explain how you know your complete chart is correct.

4. Write a number in standard form that has the same value as 6.0 + 0.08 + 0.009
   _____ Explain why you know your answer is correct.

5. Complete the table to rename 0.3 as other place values.

| | | |
|---|---|---|
| 0.**3**00 | 3 tenths | $3 \times \frac{1}{10}$ |
| 0.0**3**0 | _____ hundredths | ___ $\times \frac{1}{100}$ |
| 0.00**3** | _____ _____ | ___ $\times \frac{\square}{\square}$ |

NAME_____ DATE_____ SCORE ___/10

## 5.2A Mini-Assessment

1. Which digit is in the thousandths place in the number 35.847?

   **A** 5

   **B** 8

   **C** 4

   **D** 7

---

2. Paul has a roll of copper wire 9.578 meters long. He cut off exactly one tenth of a meter from the roll. Then he cut off two hundredths of a meter. How long is the roll of copper wire now?

   **F** 9.278 meters

   **G** 9.378 meters

   **H** 9.458 meters

   **J** 9.577 meters

---

3. The weekly rainfalls for four cities are listed in the table.

Weekly Rainfalls

| City | Rainfall (inches) |
|---|---|
| DeSoto | 0.007 |
| Houston | 7.0 |
| Harlingen | 0.07 |
| Meridian | 0.7 |

Which city had seven thousandth of an inch of rainfall?

**A** DeSoto

**B** Houston

**C** Harlingen

**D** Meridian

4. Which shows the expanded notation for 60.27?

   **F** 6 + 2 + 0.7

   **G** 60 + 0.2 + 0.07

   **H** 6 + 0.2 + 0.07

   **J** 60 + 2 + 0.7

---

5. The medium sausage kolache at Czeck Bakery costs 2.345 kolhorts. The cost of a large sausage kolache at Czeck Bakery costs 4.012 kolhorts. What is the value of the digit 1 in 4.012 kolhorts?

   **A** $\frac{1}{10}$ of a kolhort

   **B** 1 kolhort

   **C** $\frac{1}{100}$ of a kolhort

   **D** 2 kolhorts

---

6. Which statement correctly compares 0.002 to 0.02?

   **F** 0.002 is $\frac{1}{10}$ of 0.02

   **G** 0.002 is 10 times as much as 0.02

   **H** 0.002 is $\frac{1}{100}$ of 0.02

   **J** 0.002 is 100 times as much as 0.02

---

7. Angie lives 10 times as far from the city park as Lucinda. Lucinda lives 0.6 mile from the park. Stacy lives $\frac{1}{10}$ as far from the park as Angie. Gabriel lives $\frac{1}{10}$ as far from the park as Stacy. How far from the park does Gabriel live?

   **A** 0.06 mile

   **B** 6 miles

   **C** 0.6 mile

   **D** 60 miles

8. Which number has the same value as $8 \times \frac{1}{1,000}$?

**F** 0.8

**G** 0.08

**H** 8.0

**J** 0.008

---

9. Ginger wrote the number 8.397 on her paper. Which of the following shows how she should write this number in expanded notation?

**A** 8 + 3 + 9 + 7

**B** 8 + 0.3 + 0.09 + 0.007

**C** 8 + 0.3 + 0.9 + 0.7

**D** 8 + 300 + 90 + 7

---

10. What is the value of the digit 7 in 4.176?

**F** $\left(7 \times \frac{1}{10}\right)$

**G** $(7 \times 1)$

**H** $\left(7 \times \frac{1}{1,000}\right)$

**J** $\left(7 \times \frac{1}{100}\right)$

TEKSING TOWARD STAAR

MATHEMATICS ®

# GRADE 5

## TEKS/STAAR-BASED

# LESSONS

## PARENT GUIDE

## Six Weeks 1

# TEKSING TOWARD STAAR
# Six Weeks 1 Scope and Sequence
# Grade 5 Mathematics

| Lesson | TEKS/Lesson Content |
|---|---|
| **Lesson 1** | **5.2A**/represent the value of the digit in decimals through the thousandths using expanded notation and numerals |
| **Lesson 2** | **5.2B**/compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or = |
| **Lesson 3** | **5.4A**/ identify prime and composite numbers |
| **Lesson 4** | **5.3B/**multiply with fluency a three-digit number by a two-digit number using the standard algorithm<br>**5.3A/**estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division |
| **Lesson 5** | **5.3D/**represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models<br>**5.3E/**solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understandings, properties of operations, and the relationship to the multiplication of whole numbers |
| **Lesson 6** | **5.4H/**represent and solve problems related to perimeter and/or area… |
| **Lesson 7** | **5.9A/**represent categorical data with bar graphs…<br>**5.9C/**Solve one- and two-step problems using data from…a bar graph… |
| **Lesson 8** | **5.10A/**define income tax, payroll tax, sales tax, and property tax |
| **Lesson 9** | **5.2C**/round decimals to tenths or hundredths<br>**5.3A/**estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division |
| **Review** | |
| **Assessment** | |

**NOTES:**

# LESSON 2 - 5.2B

## Lesson Focus

For TEKS 5.2B students are expected to compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =.

For this TEKS students should be able to apply mathematical process standards to represent, compare, and order positive rational numbers and understand relationships as related to place value.

For STAAR Category 1 students should be able to demonstrate an understanding of how to represent and manipulate numbers and expressions.

## Process Standards Incorporated Into Lesson

**5.1.A** Apply mathematics to problems arising in everyday life, society, and the workplace.

**5.1.E** Create and use representations to organize, record, and communicate mathematical ideas.

## Vocabulary for Lesson

| PART I |
|---|
| decimal |
| compare |
| order |
| = is equal to |
| > is greater than |
| < is less than |

## Math Background Part I - Compare Decimals

Place-value charts and number lines can be used to compare decimals. The place value of the digits can also be used to compare decimals. The symbols used to compare numbers are: **<** (is less than), **>** (is greater than), and **=** (is equal to).

**NOTE:** Remember, placing a zero at the end of a decimal does not change its value.

5.4 = 5.40

15.34 = 15.340

715.04 = 715.04**0**

## Place-Value Chart to Compare Decimals

Looking at the numbers in a place-value chart can help compare decimals.

**EXAMPLE 1:** Use a place-value chart to compare 2.7 and 2.725.

Zeros can be written at the end of 2.7 until it has the same number of digits to the right of the decimal point as 2.725. So, 2.7 = 2.7**00**.

| Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|
| 2 | . | 7 | **0** | **0** |
| 2 | . | 7 | 2 | 5 |

- Start at the left. Look at the digits in the ones place.

  2.700 2.725

  Both numbers have a 2 in the ones place.
- Look at the digits in the tenths place.

  2.700 2.725

  Both numbers have a 7 in the tenths place.
- Look at the digits in the hundredths place.

  2.700 2.725

Since 2 > 0, then 2.725 > 2.700 and 2.700 < 2.725.

**EXAMPLE 2:** Use a place-value chart to compare 0.227 and 0.28.

Zeros can be written at the end of 0.28 until it has the same number of digits to the right of the decimal point as 0.227. So, 0.28 = 0.28**0**.

| Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|
| 0 | . | 2 | 2 | 7 |
| 0 | . | 2 | 8 | **0** |

- Start at the left. Look at the digits in the ones place.

  0.227 0.280

  Both numbers have a 0 in the ones place.
- Look at the digits in the tenths place.

  0.227 0.280

  Both numbers have a 2 in the tenths place.
- Look at the digits in the hundredths place.

  0.227 0.280

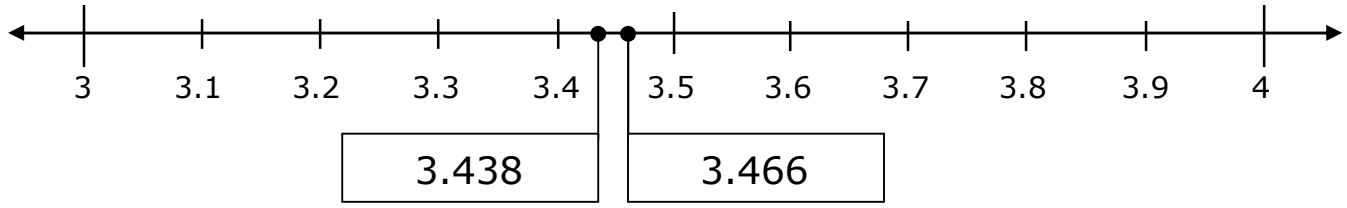
Since 8 > 2, then 0.28 > 0.227 and 0.227 < 0.28.

## Number Line to Compare Decimals

Looking at decimals on a number line can also help compare the numbers.

**EXAMPLE:** Compare 3.466 and 3.438.

• Place 3.466 and 3.438 on a number line.




• Both numbers are greater than 3 and less than 4.

• The numbers are the same in the ones and tenths places.

• Look at the hundredths places. 3 < 6, therefore 3.438 comes first on the number line between 3.4 and 3.5.

• 3.466 is a little to the right of the middle between 3.4 and 3.5.

• 3.438 is closer to 3.4 than 3.5.

• 3.466 is closer to 3.5 than 3.4.

So, 3.438 < 3.466 and 3.466 > 3.438.

## Place-Value to Compare Decimals

A simple way to compare decimals is to use what you know about place-value.

**EXAMPLE:** Compare 2.49 and 2.485.

| **Step 1**<br>Line up the decimal points. | **Step 2**<br>Compare the ones. | **Step 3**<br>Compare the tenths. | **Step 4**<br>Compare the hundredths. |
|---|---|---|---|
| 2.49<br>↓<br>2.485 | 2.49<br>↓<br>2.485<br>2 = 2 | 2.49<br>↓<br>2.485<br>4 = 4 | 2.49<br>↓<br>2.485<br>9 > 8 |

Since 9 > 8, then 2.49 > 2.485 and 2.485 < 2.49

## Math Background Part II - Ordering Decimals

Place-value charts and number lines can be used to order decimals. The place value of the digits can also be used to order decimals.

**NOTE:** Remember, placing a zero at the end of a decimal does not change its value.

5.4 = 5.40

15.34 = 15.340

715.04 = 715.040

## Place-Value Chart to Order Decimals

Looking at the numbers in a place-value chart can help order decimals.

**EXAMPLE 1:** Use a place-value chart to order 5.602, 5.51, 0.871 and 4.52 from least to greatest.

**Remember:** Zeros can be written at the end of a decimal without changing its value.

| Ones | . | Tenths | Hundredths | Thousandths |
|---|---|---|---|---|
| 5 | . | 6 | 0 | 2 |
| 5 | . | 5 | 1 | **0** |
| 0 | . | 8 | 7 | 1 |
| 4 | . | 5 | 2 | **0** |

- Start at the left. Three of the numbers have a 4 or a 5 in the ones place.

  5.602 5.510 0.871 4.520

  These numbers will be greater than the number that has a zero in the ones place. The least number is 0.871.

- Two of the numbers have a 5 in the ones place and one of the numbers has a 4 in the ones place.

  5.602 5.51 4.520

  The number with a 4 in the ones place is less than the numbers with a 5 in the ones place.

- Decide which of the two numbers with a 5 in the ones place is less. Look at the next place value, the tenths place.

  5.602 5.510

  One of the numbers with a 5 in the ones place has a 6 in the tenths place.

  The other number with a 5 in the ones place has a 5 in the tenths place.

  Since 5 is less than 6, the number 5.51 is less than the number 5.602.

The numbers in order from least to greatest are as follows:

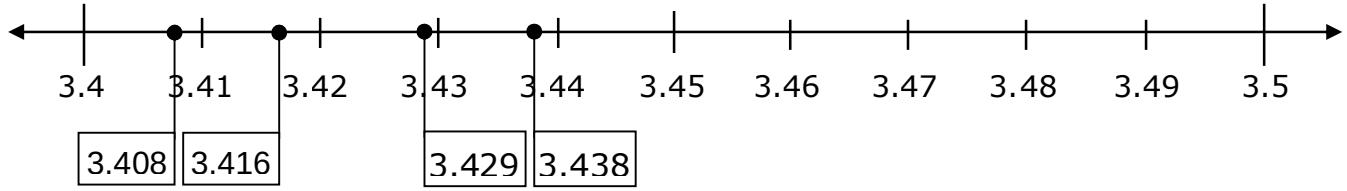
0.871 < 4.52 < 5.51 < 5.602

## Number Line to Order Decimals

Looking at decimals on a number line can also help order the numbers.

**EXAMPLE:** Order 3.416, 3.438, 3.408 and 3.429.

- Place 3.416, 3.438, 3.408 and 3.439 on a number line.




- All four numbers are greater than 3.4 and less than 3.5.
- The numbers are the same in the ones and tenths places.
- Look at the hundredths places. 3.40 < 3.41 < 3.42 < 3.43, therefore 3.408 comes first on the number line between 3.4 and 3.41.

  3.408 is closer to 3.41 than 3.4.
- 3.416 comes next on the number line between 3.41 and 3.42.

  3.416 is closer to 3.42 than 3.41.
- 3.429 comes next on the number line between 3.42 and 3.43.

  3.429 is closer to 3.43 than 3.42.
- 3.438 comes last on the number line between 3.43 and 3.44.

  3.438 is closer to 3.44 than 3.43.

So, 3.438 > 3.429 > 3.416 > 3.408 and 3.408 < 3.416 < 3.429 < 3.438.

## Place-Value to Order Decimals

A simple way to order decimals is to use what you know about place-value.

**EXAMPLE:** Order 2.497, 2.45, 2.479 and 2.48.

| **Step 1**<br>Line up the decimal points. | **Step 2**<br>Compare the ones. | **Step 3**<br>Compare the tenths. | **Step 4**<br>Continue to compare the tenths. |
|---|---|---|---|
| 2.497<br>↓<br>2.45<br>↓<br>2.479<br>↓<br>2.48 | 2.497<br>↓<br>2.45<br>↓<br>2.479<br>↓<br>2.48<br><br>2 = 2 = 2 =2 | 2.497<br>↓<br>2.45<br>↓<br>2.479<br>↓<br>2.48<br><br>9 > 5<br>9 > 7<br>9 > 8<br>So, 2.497 is the greatest number. | 2.45<br>↓<br>2.479<br>↓<br>2.48<br><br>8 > 5 and 7, so 2.48 is the next greatest number.<br><br>7 > 5, so 2.479 is the next greatest number, and 2.45 is the least number. |

So, 2.497 > 2.48 > 2.479 > 2.44 and 2.44 < 2.479 < 2.48 < 2.497.

# LESSON 4 - 5.3B & 5.3A

## Lesson Focus

For TEKS 5.3B students are expected to multiply with fluency a three-digit number by a two-digit number using the standard algorithm.

For TEKS 5.3A students are expected to estimate to determine solutions to mathematical and real-word problems involving addition, subtraction, multiplication, and division. Focus for this lesson is multiplication.

For these TEKS students should be able to apply mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy.

For STAAR Category 2 students should be able to demonstrate an understanding of how to perform operations and represent algebraic relationships.

## Process Standards Incorporated Into Lesson

**5.1.B** Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of a solution.

**5.1.D** Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

## Vocabulary for Lesson

| PART I | PART II |
|---|---|
| multiplication | estimate |
| factor | reasonable |
| product | overestimate |
| partial product | underestimate |
| | compatible numbers |

## Math Background Part I - Multiplication of Whole Numbers

**Multiplication** is a shortcut for combining groups of equal size.

**EXAMPLE:** Your family is taking 268 pounds of aluminum cans to a recycling center. The recycling center pays 12¢ per pound for aluminum cans that are brought for recycling. Adding 12¢ for 268 times would take a very long time, so using multiplication is a much faster process.

Two terms in multiplication are **factor** and **product**. The **factors** are the numbers being multiplied. Factors represent the number in each group and the number of groups. The **product** is the result of the multiplication and represent the total.

The operation of multiplication can be indicated by the multiplication symbol ($\times$) or by a dot ($\bullet$). $2 \times 3$ can also be written as $2 \bullet 3$.

**EXAMPLE:** The More Music store ordered a new CD by Silly Sounds. During the first week, the store sold 2 boxes of the CDs. There are 81 CDs in each box. What is the number of CDs the store sold during the first week?

The number in each group is 81. The number of groups is 2.

81 ← Factor
× 2 ← Factor
162 ← Product

The store sold 162 CDs during the first week.

If you know how to multiply 1-digit numbers such as $8 \times 6$, you can also multiply larger numbers such as $8 \times 666$. Multiplying multi-digit numbers is done one at a time. Each product is called a **partial product**. Multiply the value of each digit from one factor by the value of each digit from the other factor. Then find the sum of the partial products.

## Multiply a 3-Digit Number by a 1-Digit Number

These procedures can be used to multiply when both factors are greater than 10.

- Multiply the value of each digit in the 3-digit number by the value of the 1-digit number, one at a time. List the partial products and then add.
- Multiply without listing the partial products. Use what you know about regrouping.

**EXAMPLE:** The fire department in a large Texas city responded to 555 calls per day during one week. Find the number of calls they responded to during that week.

To solve the problem, multiply 555 by 7.

- **One Way** - Multiply the value of each digit in the 3-digit number by the value of the 1-digit number, one at a time. List the partial products and then add.

*HTO*
555
× 7
35 Multiply the **ones**. **7** x **5** ones = **35** ones
350 Multiply the **tens**. **7** x **5** tens = **350**
3500 Multiply the **hundreds**. **7** x **5** hundreds = **3500**
3885 Add the partial products. 35 + 350 + 3500 = 3885

The fire department responded to 3,885 calls during that week.

- **Another Way** - Multiply without listing the partial products.

```
  HTO
  3 3
  555
×   7
-----
 3885
```

Multiply the **ones**.
Since **35** ones is **3** tens and **5** ones,
Write **5** in the ones place.
Write **3** above the tens place so you won't forget it.

Multiply the **tens**.
Since **35** tens is **3** hundreds and **5** tens,
add the **5** tens to the 3 tens you already have.
Write **8** in the tens place.
Write **3** above the hundreds place so you won't forget it.

Multiply the **hundreds**.
Since **35** hundreds is **3** thousands and **5** hundreds,
add the **5** hundreds to the 3 hundreds you already have.
Write **8** in the hundreds place.
Write **3** in the thousands place.

- The fire department responded to 3,885 calls during that week.

Either way, the fire department responded to 3,885 calls during that week.

## Multiply a 2-Digit Number by a 2-Digit Number

These procedures can be used to multiply when both factors are greater than 10.

- Multiply the value of each digit in one factor by the value of each digit in the other factor. List the partial products and then add.
- Multiply without listing every partial product. Use what you know about regrouping.
- Multiply using the Distributive Property of Multiplication. Break apart one of the factors before multiplying.

**EXAMPLE:** The school auditorium has 14 rows. Each row has 28 seats. Find the number of seats in the auditorium.

To solve the problem, multiply 14 by 28.

- **One Way** - Multiply the value of each digit in one factor by the value of each digit in the other factor. List the partial products and then add.

Tens → **TO** ← Ones

```
  14
× 28
-----
  32   Multiply by the ones.
       8 x 4 ones = 32
  80   8 x 10 ones = 80
  80   Multiply the tens.
       20 x 4 tens = 80
 200   20 x 10 tens = 200
-----
 392   Add the partial products  32 + 80 + 80 + 200 = 392
```

There are 392 seats in the auditorium.

- **Another Way** - Multiply without listing every partial product. Use what you know about regrouping

***TO***
**3**
14
× 28
**112**

Multiply by the ones 8 x 14 ones = **?**
8 x 4 ones = 32 → **2** ones with **3** tens to regroup
8 x 10 ones = 80 → 8 tens + 3 tens = **11** tens
So, 8 x 14 = **112**

3
14
× 28
112
280
**392**

Multiply by the tens 20 x 14 tens = **?**
20 x 4 ones = 80 → **8** tens + **0** ones
20 x 10 ones = 200 → **2** hundreds
So, 20 x 14 = **280**.
Add the partial products. 112 + 280 = 392

There are 392 seats in the auditorium.

- **Another Way** - Use what you know about the Distributive Property of Multiplication. Break apart one of the factors before multiplying.

| | |
|---|---|
| Break apart one factor into numbers that are easy to multiply. | 14 x 28 = (**10** + **4)** x 28 |
| Multiply. | **10** x 28 = **280**<br>**4** x 28 = **112** |
| Add the two products. | 112<br>+ 280<br>392 |

There are 392 seats in the auditorium.

Using any of these procedures for multiplying two-digit numbers, there are 392 seats in the auditorium.

**NOTE:** Zeros may seem like "nothing" in a factor or product, but they are very important.

**EXAMPLE:** The website www.staarmaterials.com receives an average of 305 visits per week. At this rate, about how many visits would the website receive in 4 weeks?

To find the answer, multiply 305 by 4.

***HTO***
**2**
305
× 4
1220

4 x 5 = 20 → **2** tens + **0** ones
There are no tens in 305, but that does not mean we can forget about the tens.
4 x 0 = **0** tens
0 tens + 2 tens = **2** tens
4 x 300 = 1,200 tens → 1 thousand + 2 hundreds

At this rate, the website would receive about 1,220 visits in 4 weeks.

## Multiply a 3-Digit Number by a 2-Digit Number

When you multiply a 3-digit number by a 2-digit number, you are finding 6 products and several sums. So, it is very important to record **every** step.

These procedures can be used to multiply a 3-digit number by a 2-digit number.

- Multiply the value of each digit in one factor by the value of each digit in the other factor, record each product, and then find the sum of the partial products.
- Multiply without using the partial products. Use what you know about regrouping.
- Multiply using the Distributive Property of Multiplication. Break apart one of the factors before multiplying.

**EXAMPLE:** The fifth grade art class is making mementos for a school Cinco de Mayo celebration. Each student in the school will be given 1 memento made with 24 cm of ribbon. The school has 674 students. Find the amount of ribbon needed to make all of the mementos.

To solve the problem, multiply 24 × 674.

- **One Way** - Multiply the value of each digit in one factor by the value of each digit in the other factor, record each product, and then find the sum of the partial products.

| | |
|---|---|
| H T O<br>674 | |
| × 24 | |
| 16 | Multiply by the **ones**.<br>**4** x 4 = 16 |
| 280 | **4** x 70 = 280 |
| 2400 | **4** x 600 = 2400 |
| | Multiply by the **tens**. |
| 80 | **20** x 4 = 80 |
| 1400 | **20** x 70 = 1400 |
| 12000 | **20** x 600 = 12000 |
| 16176 | Add the partial products. |

At least 16,176 cm of ribbon is needed to make the mementos.

- **Another Way** - Multiply without listing the partial products.

| | |
|---|---|
| H T O<br>**2 1**<br>674 | Multiply by the **ones**. 4 x 674 = ?<br>**4** x 4 = 16 → **6** ones with **1** ten to regroup |
| × 24 | **4** x 70 = 280 → **8** tens + **1** ten with 2 hundreds to regroup |
| 2696 | **4** x 600 = 2400 → **24** hundreds + **2** hundreds |
| H T O<br>**1**<br>2 1<br>674 | Multiply by the **tens**. 20 x 674 = ?<br>**20** x 4 = 80 → **8** tens and 0 ones |
| × 24 | **20** x 70 = 1400 → **4** hundreds with 1 thousand to regroup |
| 2696 | **20** x 600 = 12000 → **12** thousands + **1** thousand |
| 13480 | |
| 16176 | Add the partial products. |

At least 16,176 cm of ribbon is needed to make the mementos.

- **Another Way** - Use what you know about the Distributive Property of Multiplication. Break apart one of the factors before multiplying.

| | |
|---|---|
| Break apart one factor into numbers that are easy to multiply. | 24 x 674 = (**10** + **10** + **2** + **2**) x 674 |
| Multiply. | **10** x 674 = **6740**<br>**10** x 674 = **6740**<br>**2** x 674 = **1348**<br>**2** x 674 = **1348** |
| Add the four products. | 6740<br>6740<br>1354<br>+1354<br>16176 |

At least 16,176 cm of ribbon is needed to make the mementos.

Using any of these procedures for multiplying multi-digit numbers, at least 16,176 cm of ribbon is needed to make the mementos.

## Checking Multiplication

Always check multi-digit multiplication because so many steps are involved that it is easy to make a mistake.

These are 2 different methods that can be used to check multiplication.

- Reverse the factors.
- Use the lattice method.

Jerissa found the product of 24 x 38 = 912. Now she needs to check to make sure her multiplication is correct.

**EXAMPLE 1:** Jerissa can reverse the factors.

$$\begin{array}{r} {\scriptstyle 1\ \ 3} \\ 24 \\ \times\ 38 \\ \hline {\scriptstyle 1\ \ 1}92 \\ 720 \\ \hline 912 \end{array} \qquad \begin{array}{r} {\scriptstyle 1\ \ 3} \\ 38 \\ \times\ 24 \\ \hline {\scriptstyle 1\ \ 1}52 \\ 760 \\ \hline 912 \end{array}$$

If reversing the factors gives the same product, then the multiplication is correct.

If reversing the factors does not give the same product, then one of the products is not correct.

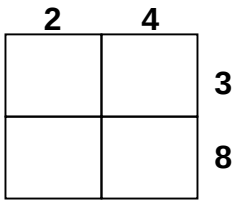
Reversing the factors shows her work is correct.

**EXAMPLE 2:** Jerissa could also use the lattice method.

- **Step 1: Draw a grid.**

  Write one factor on top.

  Write the other factor on the right.

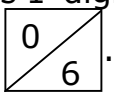


- **Step 2: In each square, write a product.**

  Multiply the digit at the top of the column by the digit to the right of the row.

  **Note:** Use a diagonal line to separate the digits in each product.

  If the product is 1-digit, write the product as 0__.

  Write 2 x 3 as 

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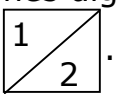
  If the product is 2-digits, write the tens digit in the top left and write the ones digit in the bottom right.

  Write 4 x 3 as 

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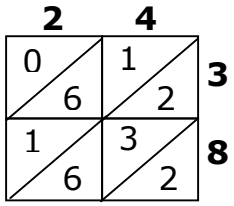
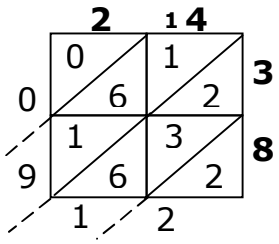



- **Step 3: Add along the diagonals.**

  Begin at the lower right.

  For 2-digit sums, add the tens digit to the digits in the next diagonal.




- **Step 4: Read the product.**

  Begin reading the product at the top left and end at the bottom right

  24 x 38 = 912

The lattice method shows her work is correct.

Using either method to check her multiplication, Jerissa's product is correct.

## Math Background Part II - Estimating Products

A **product** is the result of multiplication. Sometimes when you multiply, an exact product is not needed, so you can **estimate** the product.

The answer to any problem can be estimated before you find the exact answer. The estimate tells you about how large or small the exact answer should be. If you estimate first, you will know whether your exact answer is **reasonable**. For example, some problems ask you whether a certain number is a reasonable answer to a problem.

## Front-End Estimation of Products

To estimate products, the front digits of the factors can be multiplied.

**EXAMPLE:** The air mileage between Chicago and New York is 714 miles. Mr. Conrad made the trip 52 times in one year because he flew 26 roundtrips during the year. He earned 1 bonus point for each mile he flew. Did he earn enough bonus points for a flight that requires 30,000 points?

Use front-end estimation to answer the problem because you need to know whether he flew more than or less than 30,000 miles.

• Estimate the product of $52 \times 714$ to solve the problem.

$$\begin{array}{rcl} 714 & \longrightarrow & 700 \\ \times\ 52 & \longrightarrow & \times\ 50 \\ & & 35000 \end{array}$$

Mr. Conrad earned about 35,000 bonus points.

**NOTE:** The exact product is greater than 35,000 because both numbers were rounded down.

## Rounding One Factor to Estimate Products

If one factor is a 1-digit number, you can estimate by rounding only 1 factor.

**EXAMPLE:** The fifth grade play was performed on 4 different days. Each day, all 389 tickets were sold. About how many tickets were sold for the 4 days?

• Estimate the product of $4 \times 389$ to solve the problem.

$4 \times 389$ (Only 1 factor was rounded.)

$4 \times 400 = 1{,}600$

About 1,600 tickets were sold for the 4 days.

**NOTE:** Since 400 is greater than 389, then $4 \times 400$ is greater than $4 \times 389$. The estimate of 1,600 is greater than the actual product. This is an **overestimate**. Less than 1,600 tickets were sold for the 4 days.

## Rounding Both Factors to Estimate

If each factor is a 2-digit or a 3-digit number, you can estimate by rounding each factor to the greatest place value.

**EXAMPLE 1:** The school auditorium has 38 rows of 53 seats. About how many seats are in the auditorium?

• Estimate the product of $38 \times 53$ to solve the problem.

$38 \times 53$ → $40 \times 50 = 2{,}000$ (Both 38 and 53 were rounded.)

About 2,000 seats are in the auditorium.

**NOTE:** This **estimate** is close to the actual product because one factor was rounded up 2 and one factor was rounded down 3.

**EXAMPLE 2:** A factory made 621 computer stations for a Texas school district. Each station required 43 screws. About how many screws did the factory use for the computer stations?

• Estimate the product of $43 \times 621$ to solve the problem.

$43 \times 621$ → $40 \times 600 = 24{,}000$ (Both 43 and 621 were rounded.)

About 24,000 screws were used for the computer stations.

**NOTE:** This **estimate** is less than the actual product because both factors were rounded down.

## Compatible Numbers to Estimate Products

When you estimate, look for **compatible numbers**. Compatible numbers are numbers that work well together. In multiplication, they are number pairs that are easy to multiply.

To estimate products, replace one or both factors with compatible numbers.

**EXAMPLE:** There are 18 weeks in the school semester. Your principal gives each student a school motto pencil each week. There are 618 students in your school. About how many school motto pencils did your principal order for the semester?

• Find compatible numbers for 18 and 618 and use them to estimate the product of $18 \times 618$. Try $20 \times 600$.

$$\begin{array}{rcl} 618 & \longrightarrow & 600 \\ \times\ 18 & \longrightarrow & \times\ 20 \\ & & 12000 \end{array}$$

The principal ordered about 12,000 school motto pencils for the semester.

618 is close to 600. 18 is close to 20. So, the principal ordered about 12,000 motto pencils for the semester.

The estimate of 12,000 is greater than the actual product because both numbers were rounded up. This is an **underestimate**. The principal actually ordered less than 12,000 pencils.

Any factor is compatible with a multiple of 10, because there are shortcuts for multiplying by multiples of 10.

**EXAMPLE:** Each of the 63 sections of a rodeo arena has 98 seats. About how many seats are in the rodeo arena?

• Estimate the product of $63 \times 98$ to solve the problem.

$$\begin{array}{c} 63 \times 98 \\ \downarrow \quad \downarrow \\ 60 \times 100 = 6{,}000 \end{array}$$

Both 62 and 100 were rounded to a multiple of 10.

The rodeo arena has about 6,000 seats.

**NOTE:** This **estimate** is close to the actual product because one factor is rounded down 3 and the other factor is rounded up 2.