

PARENT GUIDE

for

GRADE 3

Mathematics

LESSONS

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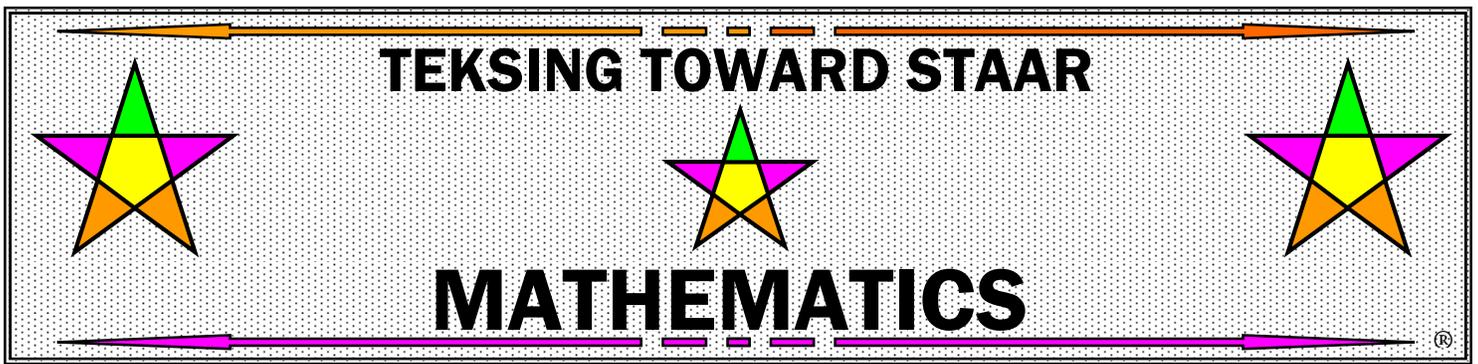
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Overview

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 3. 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

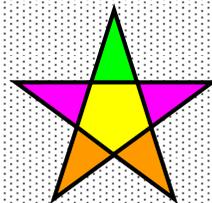
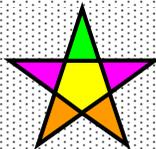
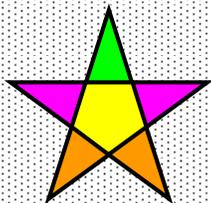
The Six Weeks Review is open-ended and will address all TEKS in the lessons. The review includes a Six Weeks Class Review and a Six Weeks Homework Review.

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

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TEKSING TOWARD STAAR



MATHEMATICS

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 3 students work to help their children, they often discover a feeling that “this is not the math I encountered as a third 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 3 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 3 should not be using a calculator in math class or while working on math homework. Students in Grade 3 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. Your child will be working on the recall of basic multiplication facts and the corresponding division facts during the school year.

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 3 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 should 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 activities, 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 teacher 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 your 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 than others. Try cutting the assignment down, but be sure to include a few of 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 note 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 note 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	<p>Analyze the given information.</p> <ul style="list-style-type: none"> • Summarize the problem in your own words. • Describe the main idea of the problem. • Identify information needed to solve the problem.
2	<p>Formulate a plan or strategy.</p> <ul style="list-style-type: none"> • Draw a picture or a diagram. • Find a pattern. • Guess and check. • Act it out. • Create or use a chart or a table. • Work a simpler problem. • Work backwards. • Make an organized list. • Use logical reasoning. • Brainstorm. • Write a number sentence or an equation.
3	<p>Determine a solution.</p> <ul style="list-style-type: none"> • Estimate the solution to the problem. • Solve the problem.
4	<p>Justify the solution.</p> <ul style="list-style-type: none"> • Explain why your solution solves the problem.
5	<p>Evaluate the process and the reasonableness of your solution.</p> <ul style="list-style-type: none"> • Make sure the solution matches the problem. • 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

Your teacher will give you and a partner 1,000 stir sticks, rubber bands, and a gallon baggie.

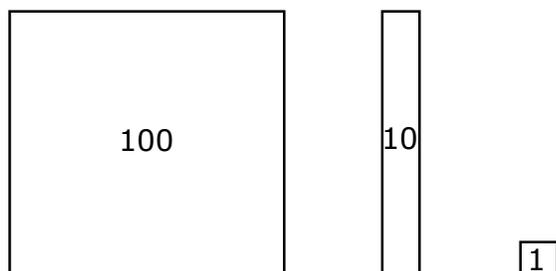
- Put a rubber band around 100 sticks to represent a value of 100. Make 9 of these.
- Put a rubber band around 10 sticks to represent a value of 10. Make 9 of these.
- You will need single sticks to represent a value of 1. You will need 9 of these.

Write your answers on notebook paper.

Use the stir sticks to model 936.

Think about the meaning of each digit.

Use these symbols to represent your model.



Say the words that represent the model.

Write the words that represent the model.

Be sure to put your set of base-10 sticks into the gallon baggie. You will use them again.

Problem-Solving 2

Write your answers on notebook paper.

How can you use a place value chart like the one shown below to represent the value of 987,605?

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

_____ + _____ + _____ + _____ + _____ + _____

Make a sketch of the place value chart on your notebook paper.

Fill in your chart to represent 987,605.

Explain the value of each digit in 987,605 on your notebook paper.

- Explain the value of the digit 9.
- Explain the value of the digit 8.
- Explain the value of the digit 7.
- Explain the value of the digit 6.
- Explain the value of the digit 0.
- Explain the value of the digit 5.

Problem-Solving 3

Write your answers on notebook paper.

The table below shows the heights of three mountains in Texas.

Mountain	Height
El Capitan	8,085 feet
Bartlett Peak	8,508 feet
Guadalupe Peak	8,749 feet

What is the expanded notation for each of the heights?

What is the word form for each of the heights?

What is the value of the digit 8 in the height of Guadalupe Peak?

What is the value of the digit 0 in the height of El Capitan?

What is the value of the digit 5 in the height of Bartlett Peak?

Problem-Solving 4

Write your answers on notebook paper.

Write 374,074 in words. What is the value of the 3 in this number?

Write 740,297 in words. What is the value of the 4 in this number?

Write 497,407 in words. What is the value of the 9 in this number?

Write 173,784 in words. What is the value of the 3 in this number?

Write 734,870 in words. What is the value of the 3 in this number?

Write 427,718 in words. What is the value of the 4 in this number?

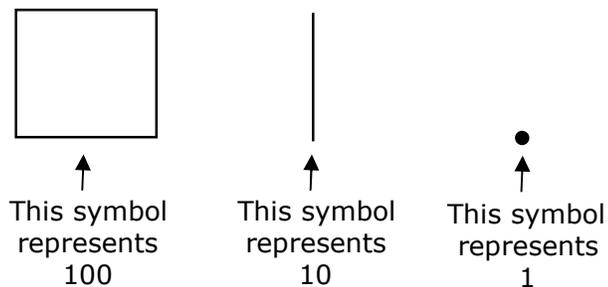
Student Activity 1

BASE-10 MODELS

MATERIALS: 1 set of base-10 sticks made during Problem-Solving 1, 1 set of base-10 blocks (3 thousands cubes, 9 hundreds flats, 9 ten rods, 9 unit cubes)

PART I: Work with a partner to represent numbers. Use the base-10 sticks.

You will draw a quick sketch to represent each of your models. Use these symbols for your quick sketch.



PROBLEM 1: Use your set of base-10 sticks to model the number 57. Draw a quick sketch to represent your model in the space below.

PROBLEM 2: Use your set of base-10 sticks to model the number 689. Draw a quick sketch to represent your model in the space below.

PROBLEM 3: Use your set of base-10 sticks to model the number 73. Draw a quick sketch to represent your model in the space below.

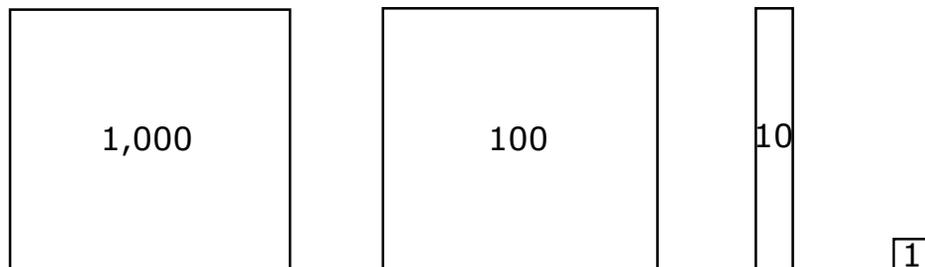
PROBLEM 4: Use your set of base-10 sticks to model the number 506. Draw a quick sketch to represent your model in the space below.

PROBLEM 5: Use your set of base-10 sticks to model the number 840. Draw a quick sketch to represent your model in the space below.

Be sure to put your base-10 sticks back into the gallon baggie when you are finished.

PART II: Work with your partner to represent numbers. Use base-10 blocks.

Use these pictures to represent a thousands cube, a hundreds flat, a ten rod, and a unit cube:



PROBLEM 1: Use your set of base-10 blocks to model the number 49. Draw a picture to represent your model in the space below.

PROBLEM 2: Use your set of base-10 blocks to model the number 587. Draw a picture to represent your model in the space below.

PROBLEM 3: Use your set of base-10 blocks to model the number 1,064. Draw a picture to represent your model in the space below.

PROBLEM 4: Use your set of base-10 blocks to model the number 706. Draw a picture to represent your model in the space below.

PROBLEM 5: Use your set of base-10 blocks to model the number 2,323. Draw a picture to represent your model in the space below.

PROBLEM 6: Use your set of base-10 blocks to model the number 860. Draw a picture to represent your model in the space below.

PROBLEM 7: Use your set of base-10 blocks to model the number 1,503. Draw a picture to represent your model in the space below.

PROBLEM 8: Use your set of base-10 blocks to model the number 704. Draw a picture to represent your model in the space below.

PROBLEM 9: Use your set of base-10 blocks to model the number 1,072. Draw a picture to represent your model in the space below.

PROBLEM 10: Use your set of base-10 blocks to model the number 3,820. Draw a picture to represent your model in the space below.

Your teacher will tell you where to return your set of base-10 blocks.

PART III: Work with your partner to answer this question.

What did you learn from this activity?

STUDENT ACTIVITY 2

Work with a partner to complete Student Activity 2.

PROBLEM 1: Record 246 in the place value chart.

Hundreds	Tens	Ones

_____ + _____ + _____

The place value chart shows the value of each digit.

- The digit ___ is in the hundreds place so it represents ___ hundreds and has a value of _____.
- 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 _____.

PROBLEM 2: Record 3,146 in the place value chart.

Thousands	Hundreds	Tens	Ones

_____ + _____ + _____ + _____

The place value chart shows the value of each digit.

- The digit ___ is in the thousands place so it represents ___ thousands and has a value of _____.
- The digit ___ is in the hundreds place so it represents ___ hundreds and has a value of _____.
- 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 _____.

PROBLEM 3: Record 23,073 in the place value chart. (**NOTE:** Don't forget zeros!)

Ten Thousands	Thousands	Hundreds	Tens	Ones

_____ + _____ + _____ + _____ + _____

The place value chart shows the value of each digit.

- The digit ___ is in the ten thousands place so it represents ___ ten thousands and has a value of _____.

- The digit ___ is in the thousands place so it represents ___ thousands and has a value of _____.
- The digit ___ is in the hundreds place so it represents ___ hundreds and has a value of _____.
- 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 _____.

PROBLEM 4: Record 250,497 in the place value chart. (**NOTE:** Don't forget zeros!)

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

_____ + _____ + _____ + _____ + _____ + _____

The place value chart shows the value of each digit.

- The digit ___ is in the hundred thousands place so it represents ___ hundred thousands and has a value of _____.
- The digit ___ is in the ten thousands place so it represents ___ ten thousands and has a value of _____.
- The digit ___ is in the thousands place so it represents ___ thousands and has a value of _____.
- The digit ___ is in the hundreds place so it represents ___ hundreds and has a value of _____.
- 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 _____.

STUDENT ACTIVITY 3

Work with a partner to complete Student Activity 3.

PROBLEM 1: Write the number 357 in expanded notation.

Record 357 in the place value chart.

Hundreds	Tens	Ones

$$\underline{\quad} \times \underline{\quad} + \underline{\quad} \times \underline{\quad} + \underline{\quad} \times \underline{\quad}$$

The place value chart shows the value of each digit.

- The digit is in the hundreds place so it represents 3 _____ and has a value of _____.
- The digit is in the _____ place so it represents tens and has a value of _____.
- The digit is in the ones place so it represents 7 _____ and has a value of _____.

The value of the number 357 is _____ + _____ + _____.

PROBLEM 2: Write the number 2,035 in expanded notation.

Record 2,035 in the place value chart.

Thousands	Hundreds	Tens	Ones

$$\underline{\quad} \times \underline{\quad} + \underline{\quad} \times \underline{\quad} + \underline{\quad} \times \underline{\quad} + \underline{\quad} \times \underline{\quad}$$

The place value chart shows the value of each digit.

- The digit is in the thousands place so it represents thousands and has a value of _____.
- The digit is in the hundreds place so it represents 0 _____ and has a value of _____.
- The digit is in the _____ place so it represents tens and has a value of _____.
- The digit is in the ones place so it represents 5 _____ and has a value of _____.

The value of the number 2,035 is _____ + _____ + _____ + _____.

PROBLEM 3: Write the number 34,084 in expanded notation.

Ten Thousands	Thousands	Hundreds	Tens	Ones

$$\underline{\quad} \times \underline{\quad\quad\quad} + \underline{\quad} \times \underline{\quad\quad\quad} + \underline{\quad} \times \underline{\quad\quad} + \underline{\quad} \times \underline{\quad\quad} + \underline{\quad} \times \underline{\quad}$$

The place value chart shows the value of each digit.

- The digit is in the ten thousands place so it represents 3 _____ and has a value of _____.
- The digit 4 is in the _____ place so it represents _____ thousands and has a value of _____.
- The digit 0 is in the hundreds place so it represents 0 _____ and has a value of _____.
- The digit is in the _____ place so it represents _____ tens and has a value of _____.
- The digit is in the ones place so it represents 4 _____ and has a value of _____.

The value of the number 34,084 is _____ + _____ + _____ + _____ + _____.

PROBLEM 4: Write the number 140,386 in expanded notation.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

$$\underline{\quad} \times \underline{\quad\quad\quad\quad} + \underline{\quad} \times \underline{\quad\quad\quad} + \underline{\quad} \times \underline{\quad\quad\quad} + \underline{\quad} \times \underline{\quad\quad\quad} + \underline{\quad} \times \underline{\quad\quad} + \underline{\quad} \times \underline{\quad}$$

The place value chart shows the value of each digit.

- The digit is in the hundred thousands place so it represents _____ hundred thousands and has a value of _____.
- The digit is in the ten thousands place so it represents _____ ten thousands and has a value of _____.
- The digit is in the thousands place so it represents _____ thousands and has a value of _____.
- The digit is in the hundreds place so it represents _____ hundreds and has a value of _____.
- 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 value of 140,386 is _____ + _____ + _____ + _____ + _____ + _____.

STUDENT ACTIVITY 4

Work with a partner to complete Student Activity 4.

PROBLEM 1: Read the number 419. This number is a _____-digit number.

Record the number 419 in the place value chart.

Hundreds	Tens	Ones

Write: _____

Read the numbers from _____ to _____.

Say: _____

PROBLEM 2: Read the number 3,974. This number is a _____-digit number.

A _____ is used to separate _____.

Record 3,974 in the place value chart.

Thousands	Hundreds	Tens	Ones

To read this number:

- first, say the _____-digit number to the _____ of the comma, _____;
- next, say the name of the period, _____;
- then, say the _____-digit number to the _____ of the comma, _____.

Read the number 3,974 as _____.

PROBLEM 3: Read the number 45,073. This is a _____-digit number.

A _____ is used to separate _____.

Record the number 45,073 in the place value chart.

Ten Thousands	Thousands	Hundreds	Tens	Ones

The ____ shows there are no hundreds.

To read this number:

- first, say the _____-digit number to the _____ of the comma,
_____;
- next, say the name of the period, _____;
- then, say the _____-digit number to the right of the comma,
_____.

Read the number 45,073 as

_____.

PROBLEM 4: Read the number 563,906. This is a _____-digit number.
A _____ is used to separate _____.

Record the number 563,906 in the place value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

The ____ shows there are no _____.

To read this number:

- first, say the _____-digit number to the _____ of the comma,
_____;
- next, say the name of the period, _____;
- then, say the _____-digit number to the right of the comma,
_____.

Read the number 563,906 as

_____.

PLACE VALUE GAME BOARD

ROUND 1

_____ / _____

ROUND 2

_____ / _____

ROUND 3

_____ / _____

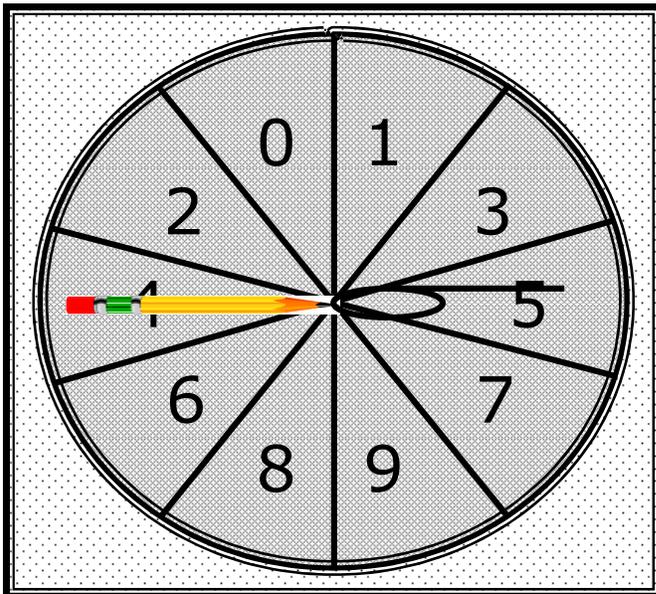
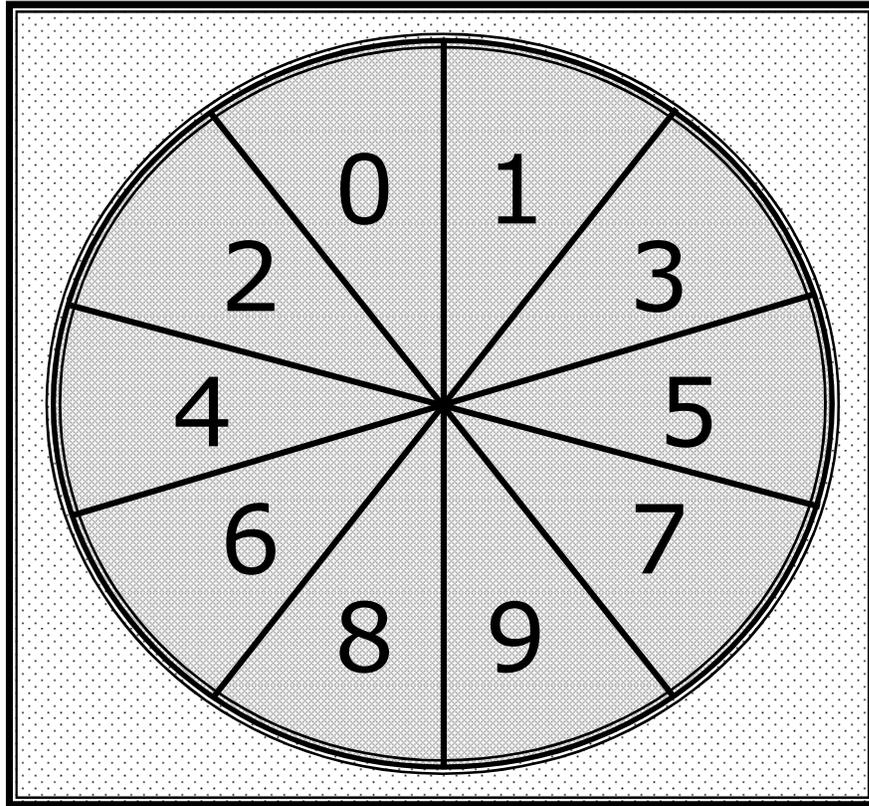
ROUND 4

_____ / _____

ROUND 5

_____ / _____

PLACE VALUE GAME SPINNER



Shape a paper clip to form the pointer.



Place the point of a pencil in the center of the pointer and in the center of the spinner.

Spin the paper clip around the pencil point.

Hands-On Activity 1

Place Value Game

Materials: Place Value Game Board per student, 10-section spinner per group of 4

Procedure – Round 1

- Work in groups of 4. Your teacher will give you 1 spinner for your group. Each student in the group will record on their own Place Value Game Board.
- Each student will spin the spinner. The student that spins the lowest number is Student 1. The student that spins the next lowest number is Student 2. The student that spins the highest number is Student 3. The student that spins the next highest number is Student 4.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.

EXAMPLE: Student 1 rolls a 7. Each student writes a 7 in one of the places on their Place Value Game Board - ROUND 1.

_____ **7** _____, _____ _____

- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 2

- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 3

- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 4

- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.

Procedure – Round 5

- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 3 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 4 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 1 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.
- Student 2 spins the spinner. Each student writes the digit that comes up on the spinner in one space on his or her Place Value Game Board. Once the digit is written, it cannot be erased or moved.

Answer the following questions about your Place Value Game Board:

- Write the number you wrote for Round 1 in words in the space below.
- Write the number you wrote for Round 3 in words in the space below.
- Write the number you wrote for Round 5 in words in the space below.
- What is the number with the greatest value that could have been written for Round 2?
- What is the number with the greatest value that could have been written for Round 4?
- What strategy would you use the next time you play this game?
- Rearrange the digits in your smallest number to make the largest number you can.

- Rearrange the digits in your largest number to make the smallest number you can.

Work with your group to answer the following questions:

- Which Student in your group made the number with the greatest value in Round 2?
_____ How do you know this is the number with the greatest value?
- Which Student in your group made the number with the greatest value in Round 5?
_____ How do you know this is the number with the greatest value?
- Which Student in your group made the number with the least value in Round 3?
_____ How do you know this is the number with the least value?
- Which Student in your group made the number with the least value in Round 4?
_____ How do you know this is the number with the least value?

NAME _____

DATE _____

SCORE ___/5

3.2A/3.2B Skills and Concepts Homework 1

Ask someone to help you find 100 small items (beans, rice, stir sticks, crayons, paper clips, etc.) to use to complete your homework. Put the 100 items in a baggie or a container.

1. Use your 100 small items to model 13. Be sure to create your model in sets of 10 and a set of ones. Draw a sketch of your model in the space below.

Write 13 in words.

2. Use your 100 small items to model 28. Be sure to create your model in sets of 10 and a set of ones. Draw a sketch of your model in the space below.

Write 28 in words.

3. Use your 100 small items to model 45. Be sure to create your model in sets of 10 and a set of ones. Draw a sketch of your model in the space below.

Write 45 in words.

4. Use your 100 small items to model 67. Be sure to create your model in sets of 10 and a set of ones. Draw a sketch of your model in the space below.

Write 67 in words.

5. Use your 100 small items to model 89. Be sure to create your model in sets of 10 and a set of ones. Draw a sketch of your model in the space below.

Write 89 in words.

NAME _____

DATE _____

SCORE ___/5

3.2A/3.2B Skills and Concepts Homework 2

1. Write fourteen thousand, six hundred fifty-seven in standard form. Make a place value chart to prove your answer is correct.

2. Write 704,000 in words. Explain why your answer is correct.

3. Write twenty-eight thousand, three hundred ninety-one in expanded notation. Make a place value chart to prove your answer is correct.

4. What is the value of the digit 3 in the number 356,048? Make a place value chart to prove your answer is correct.

5. Erin wrote a number with a 2 in the thousands place, a 7 in the hundreds place, and a 5 in the tens place. What number could Erin have written? Make a place value chart to prove your answer is correct.

NAME _____

DATE _____

SCORE ___/5

3.2A/3.2B Skills and Concepts Homework 3

1. Write two hundred forty-three in standard form. Make a place value chart to prove your answer is correct.

2. Write a number in standard form that has the same value as $500 + 30 + 4$. Explain why your answer is correct.

3. Write seven hundred eight in standard form. Make a place value chart to prove your answer is correct.

4. Write 763,456 in expanded notation. Make a place value chart to prove your answer is correct.

5. Write a number in standard form that has the same value as $400 + 60 + 8$. Explain why your answer is correct.

NAME _____

DATE _____

SCORE ___/5

3.2A/3.2B Skills and Concepts Homework 4

1. Write seventeen thousand, two hundred forty-three in standard form. Make a place value chart to prove your answer is correct.
2. Write a number that has the same value as $700,000 + 50,000 + 30 + 4$. Explain why your answer is correct.
3. Write six hundred seventy-four thousand, eight in expanded notation. Make a place value chart to prove your answer is correct.
4. What is the value of the digit 7 in the number 276,048? Make a place value chart to prove your answer is correct.
5. When you go from right to left in a number, how are the values of the places related to each other? Explain how you know your answer is correct.

NAME _____

DATE _____

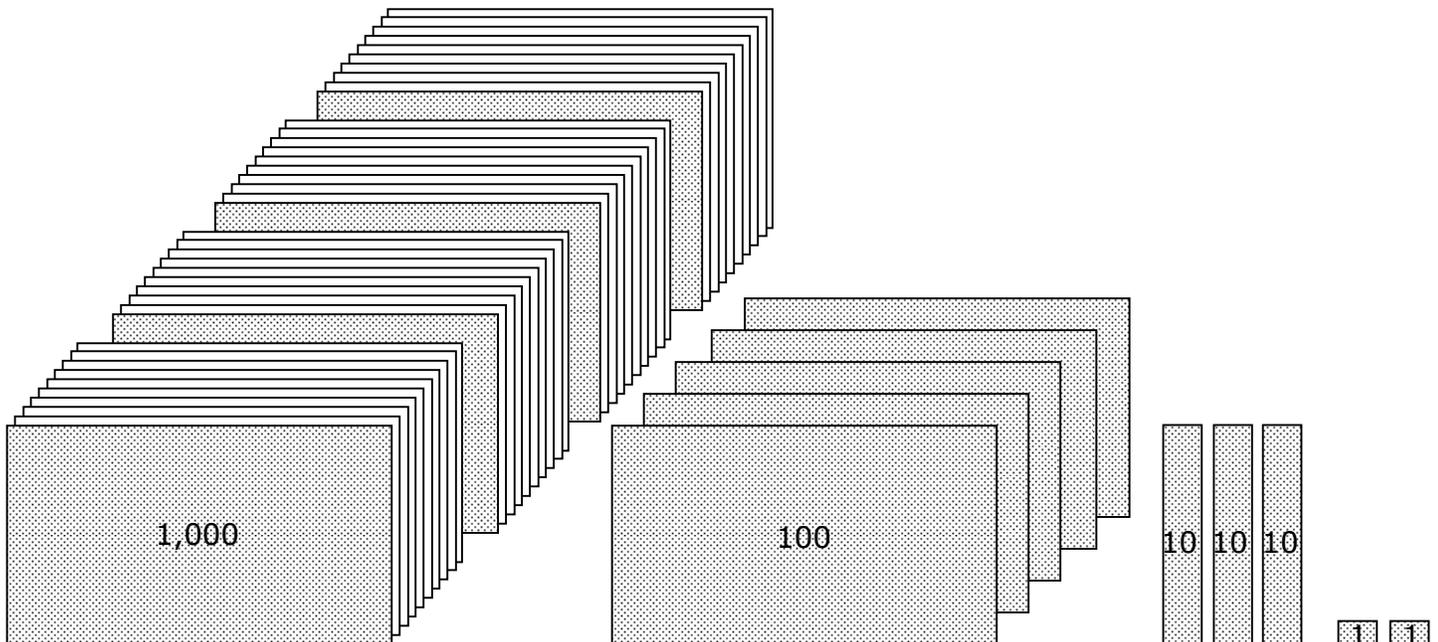
SCORE ___/10

3.2A/3.2B Mini-Assessment

1. Which number has the same value as $70,000 + 4,000 + 800 + 3$?

- A** 70,483
- B** 74,803
- C** 70,843
- D** 74,830

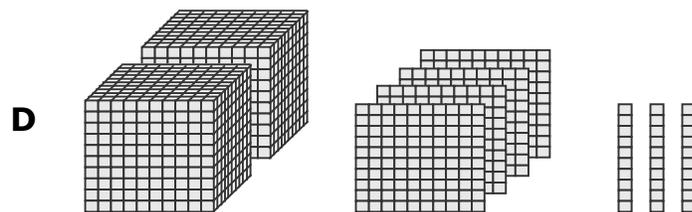
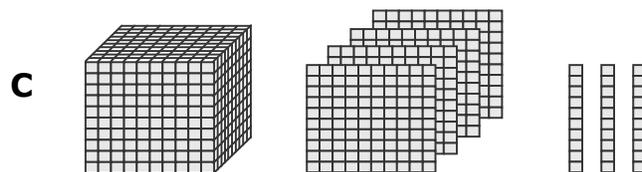
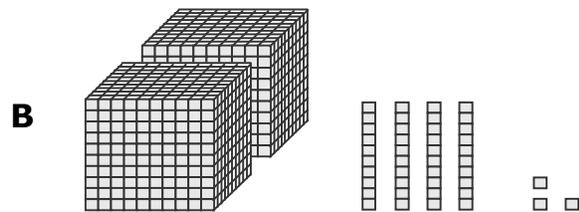
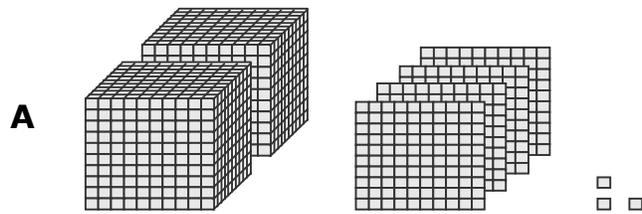
2. Keisha created the place value model shown below.



Which number has the same value as the model?

- F** 1,132
- G** 10,132
- H** 4,532
- J** Not here

3. Which model has the same value as $2,000 + 40 + 3$?



4. Grocery stores donated 63,063 cans of food to a local food bank during the holiday season. Which of the following has the same value as 63,063?

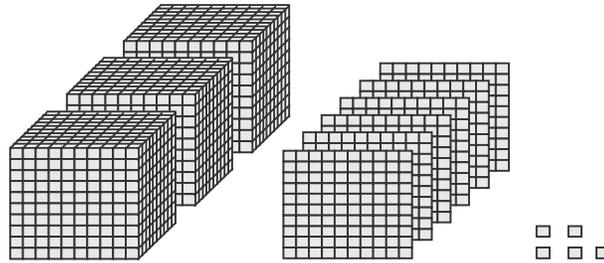
F $6,000 + 300 + 60 + 3$

G $60,000 + 30 + 3 + 6 + 3$

H $6,000 + 300 + 60 + 3$

J $60,000 + 3,000 + 60 + 3$

5. Sean created the place value model shown below.



Which of the following has the same value as the model?

- A** 2,505
- B** 3,065
- C** 365
- D** 3,605

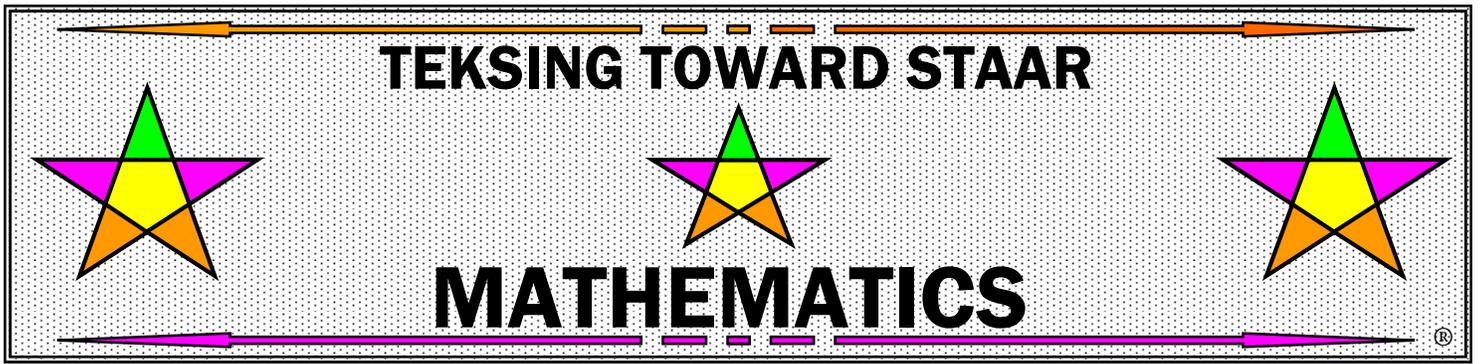
6. In 2011 the population of Mission, Texas, was 79,368. Which digit in the number 79,368 has a value 10 times more than the value of the tens place?

- F** 7
- G** 3
- H** 6
- J** 9

7. The total area of the state of Texas is 696,241 square kilometers. Which digit is in the thousands place in the number 696,241?

- A** 2
- B** 6
- C** 4
- D** 9

8. Which number represents 2 ten thousands, 5 thousands, 8 hundreds, and 3 ones?
- F** 2,583
 - G** 25,830
 - H** 25,803
 - J** Not here
-
9. What is the value of the digit 3 in 93,084?
- A** 30
 - B** 1,000
 - C** 300
 - D** 3,000
-
10. Arial wrote a number with a 6 in the ten thousands place, a 2 in the thousands place, a 7 in the hundreds place, and a 9 in the ones place. Which number could Arial have written?
- F** 6,279
 - G** 62,079
 - H** 60,279
 - J** 62,709



GRADE 3

TEKS/STAAR-BASED LESSONS

PARENT GUIDE

Six Weeks 1

**TEKSING TOWARD STAAR
Six Weeks 1 Scope and Sequence
Grade 3 Mathematics**

Lesson	TEKS/Lesson Content
Lesson 1	<p>3.2A/compose and decompose numbers up to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate</p> <p>3.2B/describe the mathematical relationships found in the base-10 place value system through the hundred thousands place</p>
Lesson 2	<p>3.2C/represent a number on a number line as being between two consecutive multiples of 10; 100; 1,000; or 10,000 and use words to describe relative size of numbers in order to round whole numbers</p> <p>3.4B/round to the nearest 10 or 100 or use compatible numbers to estimate solutions to addition and subtraction problems</p>
Lesson 3	<p>3.2D/compare and order whole numbers up to 100,000 and represent the comparisons using the symbols $>$, $<$, or $=$</p>
Lesson 4	<p>3.5A/represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations</p> <p>3.4A/solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationships between addition and subtraction</p>
Lesson 5	<p>3.7C/determine the solutions to problems involving addition and subtraction of time intervals in minutes using pictorial models or tools such as a 15-minute even plus a 30-minute event equals 45 minutes</p>
Lesson 6	<p>3.3A/represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using concrete objects and pictorial models, including strip diagrams and number lines</p> <p>3.7A/represent fractions of halves, fourths, and eights as distances from zero on a number line</p> <p>3.3B/determine the corresponding fraction greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 given a specified point on a number line</p>
Lesson 7	<p>3.6A/classify and sort two-...dimensional figures based on attributes using formal geometric language</p>
Lesson 8	<p>3.7B/determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems</p>
Lesson 9	<p>3.8A/summarize a data set with multiple categories using a frequency table...pictograph...</p> <p>3.8B/solve one- and two-step problems using categorical data represented with a frequency table...pictograph</p>
Lesson 10	<p>3.9A/explain the connection between human capital/labor and income</p>
Review	
Assessment	

NOTES:

Lesson 1 - 3.2A & 3.2B

Lesson Focus

For TEKS 3.2A students are expected to compose and decompose numbers up to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate.

For TEKS 3.2B students are expected to describe the mathematical relationships found in the base-10 place value system through the hundred thousands place.

For these TEKS students should be able to apply mathematical process standards to represent and compare whole numbers and understand relationships 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

- 3.1.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.
- 3.1.E** Create and use representations to organize, record, and communicate mathematical ideas.
- 3.1.F** Analyze mathematical relationships to connect and communicate mathematical ideas.

Vocabulary for Lesson

PART I	PART II	PART III
digit	expanded form	periods
standard form	expanded notation	
place value		
word form		

Math Background Part I - Place Value

Our whole number system is based on a simple pattern of tens. Each place has ten times the value of the place to its right.

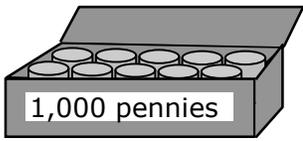
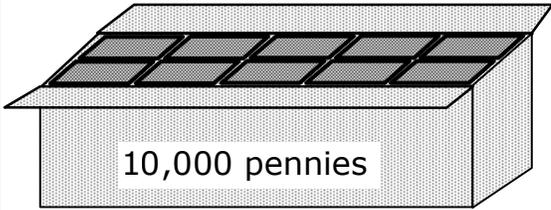
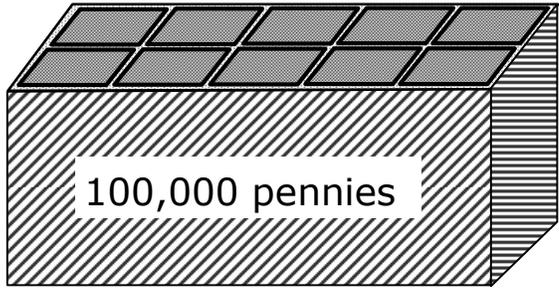
EXAMPLE 1: A place value chart can be used to show the value of numbers. Each place in the chart has a value of 10 times the place to its right.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
10 ten thousands	10 thousands	10 hundreds	10 tens	10 ones	

- tens place = 10 ones
- hundreds place = 10 tens
- thousands place = 10 hundreds
- ten thousands place = 10 thousands
- hundred thousands place = 10 ten thousands

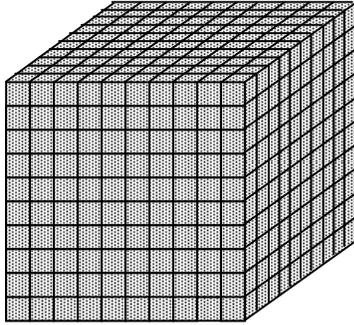
EXAMPLE 2:

Imagine 100,000 pennies.

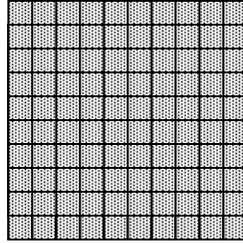
This container holds 100 pennies.	100	
This box holds 10 containers of 100 pennies.	1,000	
This carton holds 10 boxes of 1,000 pennies.	10,000	
This crate holds 10 cartons of 10,000 pennies.	100,000	

Every **digit** in a number has a value. Digits are the symbols used to represent whole numbers in **standard form**. The digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The position, or place, a digit is in tells you the value of the digit. This value is called **place value**.

- **Write:** 247
- **Say:** *two hundred forty-seven*
- **Another way to model place value is to use base-10 blocks.**



This base-10 cube is made of 1,000 unit cubes.
It has a value of 1,000.



This base-10 flat is made of 100 unit cubes.
It has a value of 100.



This base-10 rod is made of 10 unit cubes.
It has a value of 10.

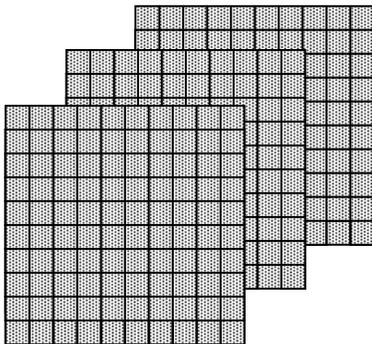


This base-10 unit is made of 1 cube.
It has a value of 1.

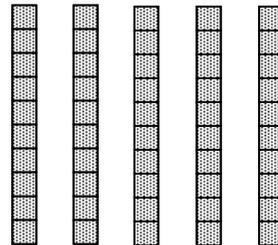
- **Write:** 1,111
- **Say:** *one thousand, one hundred eleven*

EXAMPLE 1: In the number 358 the 3 represents 3 hundreds, the 5 represents 5 tens and the 8 represents 8 ones. Represent 358 using a model.

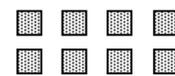
- **Think:** 3 hundreds + 5 tens + 8 ones
Use base-10 blocks to create the model.



3 hundreds



5 tens



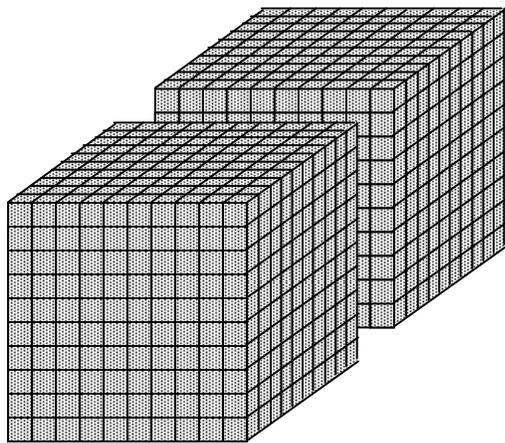
8 ones

- **Write:** 358 (**standard form**)
- **Say:** *three hundred fifty-eight* (**word form**)

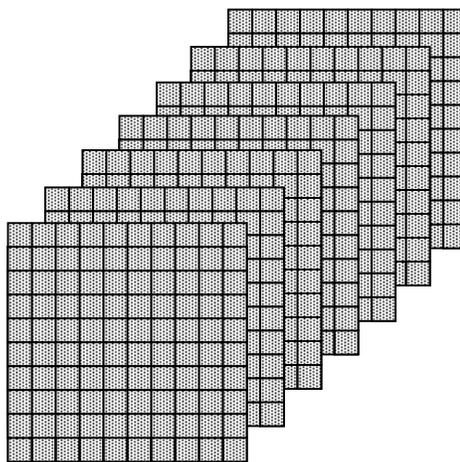
EXAMPLE 2: In the number 2,715 the 2 represents 2 thousands, the 7 represents 7 hundreds, the 1 represents 1 ten and the 5 represents 5 ones. Represent 2,715 using a model.

- **Think:** 2 thousands + 7 hundreds + 1 ten + 5 ones

Use base-10 blocks to create the model.



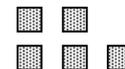
2 thousands



7 hundreds



1 ten



5 ones

- **Write:** 2,715
- **Say:** *two thousand, seven hundred fifteen*

Problem-Solving Model

Step	Description of Step
1	<p>Analyze the given information.</p> <ul style="list-style-type: none"> • Summarize the problem in your own words. • Describe the main idea of the problem. • Identify information needed to solve the problem.
2	<p>Formulate a plan or strategy.</p> <ul style="list-style-type: none"> • Draw a picture or a diagram. • Find a pattern. • Guess and check. • Act it out. • Create or use a chart or a table. • Work a simpler problem. • Work backwards. • Make an organized list. • Use logical reasoning. • Brainstorm. • Write a number sentence or an equation.
3	<p>Determine a solution.</p> <ul style="list-style-type: none"> • Estimate the solution to the problem. • Solve the problem.
4	<p>Justify the solution.</p> <ul style="list-style-type: none"> • Explain why your solution solves the problem.
5	<p>Evaluate the process and the reasonableness of your solution.</p> <ul style="list-style-type: none"> • Make sure the solution matches the problem. • 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?

Math Background Part II - Using a Place Value Chart to Understand Numbers

This place value chart shows the relationships in the base-10 place value system.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
			2	4	6
			200	+ 40	+ 6

EXAMPLE 1: Look at 246 in the place value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
			2	4	6
			200	+ 40	+ 6

The place value chart shows the value of each digit.

- The digit 2 is in the hundreds place so it represents 2 hundreds and has a value of 200.
- The digit 4 is in the tens place so it represents 4 tens and has a value of 40.
- The digit 6 is in the ones place so it represents 6 ones and has a value of 6.

EXAMPLE 2: Look at 4,257 in the place value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
		4	2	5	6
		4	+ 200	+ 50	+ 6

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

- The digit 4 is in the thousands place so it represents 4 thousands and has a value of 4,000.
- The digit 2 is in the hundreds place so it represents 2 hundreds and has a value of 200.
- The digit 5 is in the tens place so it represents 5 tens and has a value of 50.
- The digit 7 is in the ones place so it represents 7 ones and has a value of 7.

EXAMPLE 3: Look at 34,084 in the place value chart. (**NOTE:** Don't forget zeros!)

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
	3	4	0	8	4
	30,000	+ 4,000	+ 0	+ 80	+ 4

The place value chart shows the value of each digit.

- The digit 3 is in the ten thousands place so it represents 3 ten thousands and has a value of 30,000.
- The digit 4 is in the thousands place so it represents 4 thousands and has a value of 4,000.
- The digit 0 is in the hundreds place so it represents 0 hundreds and has a value of 0.
- The digit 8 is in the tens place so it represents 8 tens and has a value of 80.
- The digit 4 is in the ones place so it represents 4 ones and has a value of 4.

EXAMPLE 4: Look at 140,386 in the place value chart. (**NOTE:** Don't forget zeros!)

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
1	4	0	3	8	6
100,000	+ 40,000	+ 0	+ 300	+ 80	+ 6

The place value chart shows the value of each digit.

- The digit 1 is in the hundred thousands place so it represents 1 hundred thousand and has a value of 100,000.
- The digit 4 is in the ten thousands place so it represents 4 ten thousands and has a value of 40,000.
- The digit 0 is in the thousands place so it represents 0 thousands and has a value of 0.
- The digit 3 is in the hundreds place so it represents 3 hundreds and has a value of 300.
- The digit 8 is in the tens place so it represents 8 tens and has a value of 80.
- The digit 6 is in the ones place so it represents 6 ones and has a value of 6.

Math Background Part III - Writing Numbers in Expanded Notation

Understanding how to write numbers in **expanded form**, or **expanded notation**, is another way to help you understand place value. Expanded form and expanded notation are ways to write numbers to show the value of each digit.

EXAMPLE 1: Write the number 43,809 in expanded notation.

Look at 43,809 in the place value chart.

Ten Thousands	Thousands	Hundreds	Tens	Ones
4	3	8	0	9
$4 \times 10,000$	$+ 3 \times 1,000$	$+ 8 \times 100$	$+ 0 \times 10$	$+ 9 \times 1$

The place value chart shows the value of each digit.

- The digit 4 is in the ten thousands place so it represents 4 ten thousands and has a value of 40,000.
- The digit 3 is in the thousands place so it represents 3 thousands and has a value of 3,000.
- The digit 8 is in the hundreds place so it represents 8 hundreds and has a value of 800.
- The digit 0 is in the tens place so it represents 0 tens and has a value of 0.
- The digit 9 is in the ones place so it represents 9 ones and has a value of 9.

The value of the number 43,809 is $40,000 + 3,000 + 800 + 0 + 9$.

EXAMPLE 2: Write the number 205,497 in expanded notation.

Look at 205,497 in the place value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
2	0	5	4	9	7
$2 \times 100,000$	$+ 0 \times 10,000$	$+ 5 \times 1,000$	$+ 4 \times 100$	$+ 9 \times 10$	$+ 7 \times 1$

The place value chart shows the value of each digit.

- The digit 2 is in the hundred thousands place so it represents 2 hundred thousands and has a value of 200,000.
- The digit 0 is in the ten thousands place so it represents 0 ten thousands and has a value of 0.
- The digit 5 is in the thousands place so it represents 5 thousands and has a value of 5,000.
- The digit 4 is in the hundreds place so it represents 4 hundreds and has a value of 400.
- The digit 9 is in the tens place so it represents 9 tens and has a value of 90.
- The digit 7 is in the ones place so it represents 7 ones and has a value of 7.

The value of the number 205,497 is $200,000 + 0 + 5,000 + 400 + 90 + 7$.

Math Background Part IV - Using Place Value to Read Numbers to 999,999

When you read numbers, always start on the left. Numbers are read in groups of three digits called **periods**.

Thousands Period			Ones Period		
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
4	6	9	4	6	0

EXAMPLE: Read the number 528. This number is a three-digit number. Look at 528 in a place value chart.

Ones Period		
Hundreds	Tens	Ones
5	2	8

Write: 528

Read the numbers from left to right.

Say: *five hundred twenty-eight*

Many numbers have more than three digits. The digits in these numbers are arranged in groups of three called **periods**. A comma is used to separate each **period**.

EXAMPLE 1: Read the number 2,685. This number is a four-digit number. (**NOTE:** A comma is used to separate periods.)

Look at 2,685 in the place value chart.

Thousands	Hundreds	Tens	Ones
2	6	8	5

To read this number:

- first, say the one-digit number to the left of the comma, *two*;
- next, say the name of the period, *thousand*;
- then, say the three-digit number to the right of the comma, *six hundred eighty-five*.

Read the number 2,685 as *two thousand, six hundred eighty-five*.

EXAMPLE 2: Read the number 45,073. This is a five-digit number. (**NOTE:** A comma is used to separate periods.)

Look at 45,073 in the place value chart.

Ten Thousands	Thousands	Hundreds	Tens	Ones
4	5	0	7	3

To read this number:

The 0 shows there are no hundreds.

- first, say the two-digit number to the left of the comma, *forty-five*;
- next, say the name of the period, ***thousand***;
- then, say the three-digit number to the right of the comma, ***seventy-three***.

Read the number 45,073 as ***forty-five thousand, seventy-three***.

EXAMPLE 3: Read the number 342,805. This is a six-digit number.

(**NOTE:** A comma is used to separate periods.)

Look at 342,805 in the place value chart.

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
3	4	2	8	0	5

The 0 shows there are no tens.

To read this number:

- first, say the three-digit number to the left of the comma, *three hundred forty-two*;
- next, say the name of the period, *thousand*;
- then, say the three-digit number to the right of the comma, *eight hundred five*.

Read the number 342,805 as *three hundred forty-two thousand, eight hundred five*.

Lesson 6 - 3.3A, 3.3B & 3.7A**Lesson Focus**

For TEKS 3.3A students are expected to represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using concrete objects and pictorial models, including strip diagrams and number lines. Concrete models should be linear in nature to build toward use of strip diagrams and number lines.

For TEKS 3.3B students are expected to determine the corresponding fraction greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 given a specified point on a number line. The focus is on the part to whole representations using tick marks on a number line.

For these TEKS 3.3A and 3.3B students should be able to apply mathematical process standards to represent and explain fractional units.

For TEKS 3.7A students are expected to represent fractions of halves, fourths, and eighths as distances from zero on a number line. The focus is on the length of the portion of a number between 0 and the location of the point.

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

- 3.1.A** Apply mathematics to problems arising in everyday life, society, and the workplace.
- 3.1.C** Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- 3.1.D** Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- 3.1.E** Create and use representations to organize, record, and communicate mathematical ideas.
- 3.1.F** Analyze mathematical relationships to connect and communicate mathematical ideas.

Vocabulary for Lesson

Part I	Part II
fraction	number line
numerator	fraction bars
denominator	equal distances
whole object	equal lengths
set of objects	
equal parts	

Math Background Part I - Fractions

A **fraction** is a number that describes a part of a whole or a part of a group by using **equal** parts.

Parts of a Fraction

The parts of a fraction are the **numerator** and the **denominator**. The **denominator** is the bottom number of a fraction and tells how many **equal** parts are in the whole. The **numerator** is the top number of a fraction and tells how many of the **equal** parts the fraction represents.

Using Concrete Objects to Model Fractions

Concrete objects can be used to model fractions that represent part of a whole object or part of a set of objects.

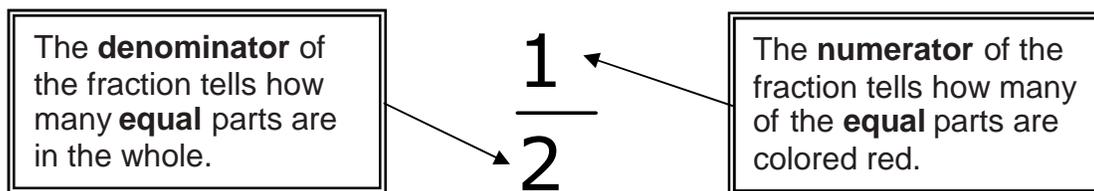
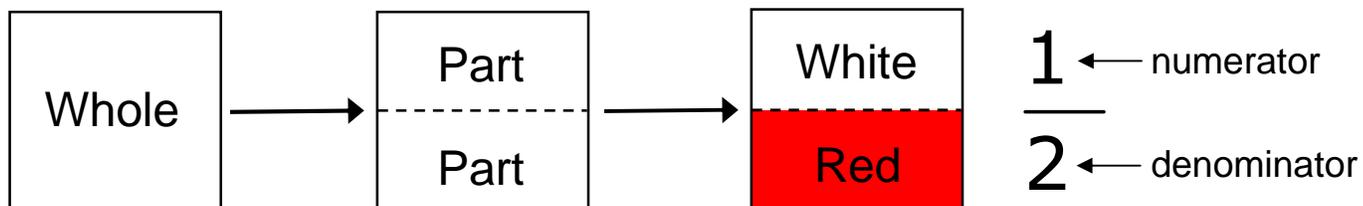
Fractional Part of a Whole Object

Use objects to model fractions that represent part of a whole object.

EXAMPLE 1: Construct a concrete model to represent a fractional part of a whole object.

Give each student a square piece of white paper. The square represents a whole.

Students will fold the paper in half to make 2 equal parts. Students will leave the top part of the square white and will color the bottom part red. What fraction of the piece of paper is colored red?

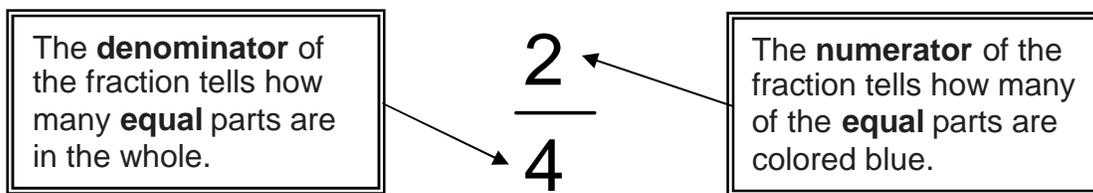
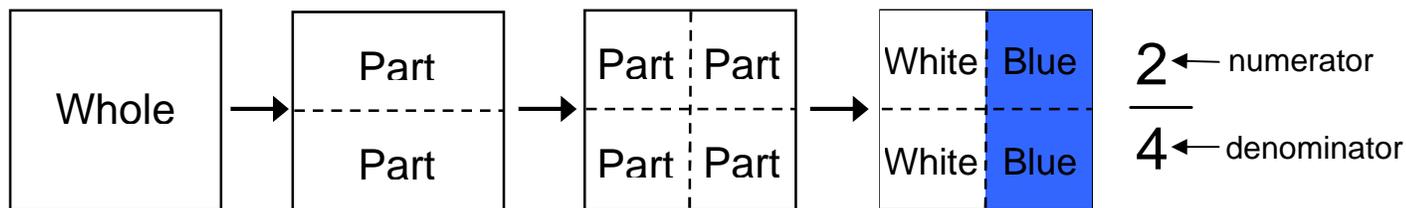


- The fraction $\frac{1}{2}$ is read as **one half**.
- The fraction $\frac{1}{2}$ represents that 1 out of 2 equal parts of the piece of paper are colored red.
- The piece of paper shows $\frac{1}{2}$ of the paper is red.

Students will use scissors to cut their square into 2 parts - 1 white part and 1 red part. They will place the white part on top of the red part to verify they have 2 equal parts.

EXAMPLE 2: Construct a concrete model to represent a fractional part of a whole object.

Give each student a square piece of white paper. The square represents a whole. Students will fold the paper in half horizontally to make 2 equal parts. Then they will fold the paper in half vertically to make 4 equal parts. Students will leave the 2 parts on the left side white and will color the 2 parts on the right side blue. What fraction of the piece of paper is colored blue?



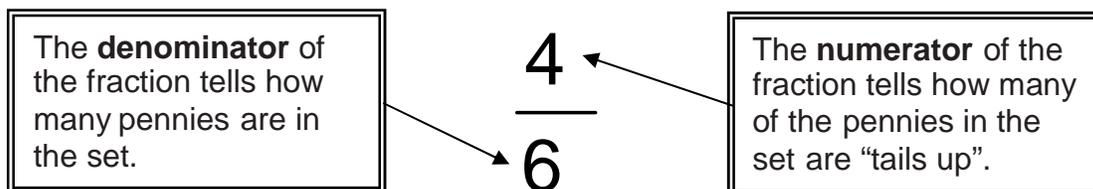
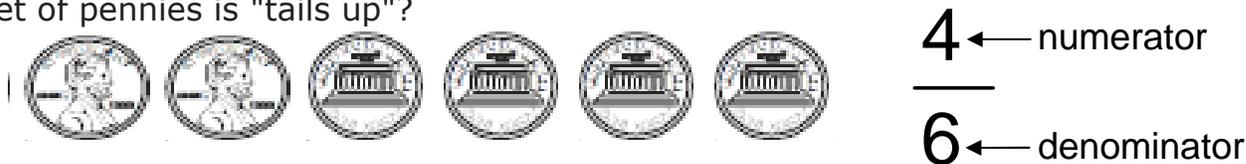
- The fraction $\frac{2}{4}$ is read as **two fourths**.
- The fraction $\frac{2}{4}$ represents that 2 out of 4 equal parts of the piece of paper are colored blue.
- The piece of paper shows $\frac{2}{4}$ of the piece of paper is blue.

Students will use scissors to cut their square into 4 equal parts - 2 white parts and 2 blue parts. They will stack the 4 parts to verify they have 4 equal parts.

Fractional Part of a Set of Objects

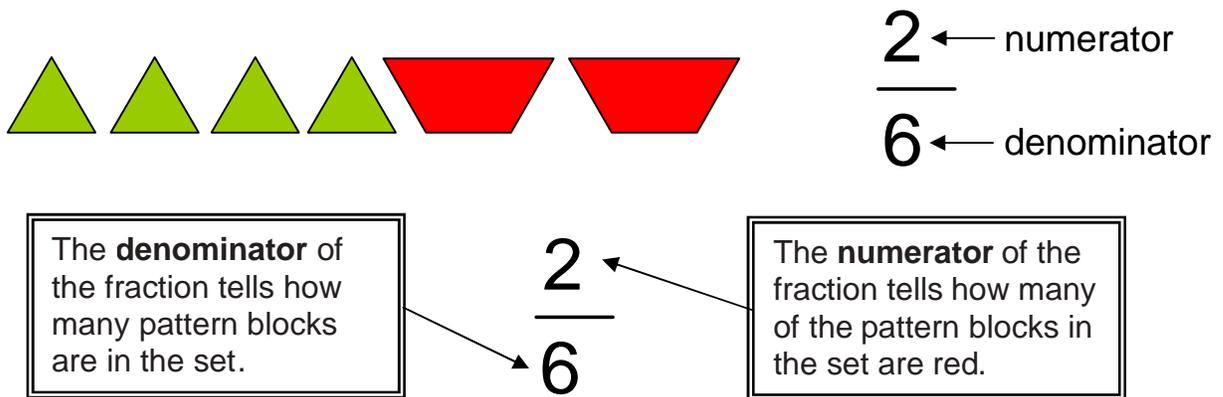
Use objects to model fractions that represent part of a set of objects.

EXAMPLE 1: Construct a concrete model to represent a fractional part of a set of objects. Give each student a set of 6 pennies. Students will turn the pennies so that 2 of the pennies are "heads up" and 4 of the pennies are "tails up". What fraction of the set of pennies is "tails up"?



- The fraction $\frac{4}{6}$ is read as **four sixths**.
- The fraction $\frac{4}{6}$ represents that 4 out of 6 of the pennies in the set are "tails up".
- The set of pennies shows that $\frac{4}{6}$ of the pennies are "tails up".

EXAMPLE 2: Construct a concrete model to represent a fractional part of a set of objects. Give each student pattern blocks: 4 green triangles and 2 red trapezoids. Students will use the pattern blocks to create a set with 4 green pattern blocks and 2 red pattern blocks. What fraction of the set of pattern blocks is red?



- The fraction $\frac{2}{6}$ is read as **two sixths**.
- The fraction $\frac{2}{6}$ represents that 2 out of 6 of the pattern blocks in the set are red.
- The set of pattern blocks shows that $\frac{2}{6}$ of the pattern blocks are red.

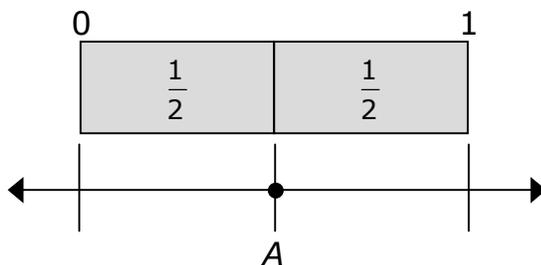
Math Background Part II - Fractions on a Number Line

A number line can be used to show fractions. The length from 0 to 1 on the number line represents one whole. The number line can be divided into any number of equal parts, or lengths.

Fractions Greater Than One and Less Than or Equal to One

If you are given a specified point on a number line, you can determine a corresponding fraction greater than zero and less than or equal to one.

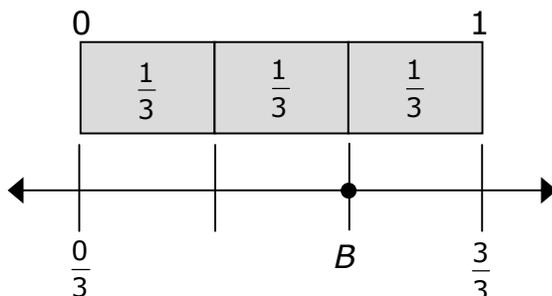
EXAMPLE 1: The model shows two fraction bars above a number line. Point *A* is located on the number line. What fraction does Point *A* represent?



- The number line is divided into 2 equal sections.
- There are 2 equal fraction bars above the number line.
- The first fraction bar on the left is the same length as the first section marked on the number line.
- The next fraction bar is the same length as the second section marked on the number line and ends at 1.
- This means that the two fraction bars are equal to 1 whole.
- This also means that the two fraction bars are equal to $\frac{2}{2}$ on the number line.
- The end of 1 fraction bar marked $\frac{1}{2}$ is at the same place as the second mark on the number line.

So, Point *A* represents the fraction $\frac{1}{2}$ on this number line.

EXAMPLE 2: The model shows three fraction bars above a number line. Point *B* is located on the number line. What fraction does Point *B* represent?

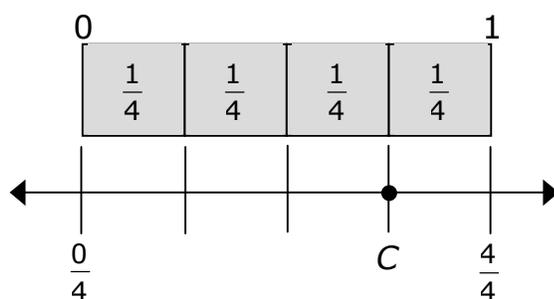


- The number line is divided into 3 equal sections.

- There are 3 equal fraction bars above the number line.
- The first fraction bar is the same length as the first section on the number line.
- The next fraction bar is the same length as the second section on the number line.
- The next fraction bar is the same length as the third section on the number line.
- This means that the three fraction bars are equal to 1 whole.
- This also means that the three fraction bars are equal to $\frac{3}{3}$ on the number line.
- The end of the second fraction bar marked $\frac{1}{3}$ is at the same place as the end of the second section after zero and $\frac{0}{3}$ on the number line.

So, Point B represents the fraction $\frac{2}{3}$ on this number line. This means that Point B is located at $\frac{2}{3}$ of the distance on the number line between 0 or $\frac{0}{3}$ and 1 or $\frac{3}{3}$.

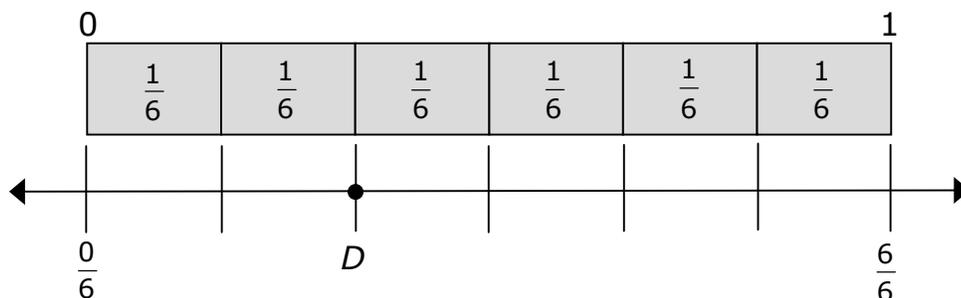
EXAMPLE 3: The model shows four fraction bars above a number line. Point C is located on the number line. What fraction does Point C represent?



- The number line is divided into 4 equal sections.
- There are 4 equal fraction bars above the number line.
- The first fraction bar is the same length as the first section on the number line.
- The next fraction bar is the same length as the second section on the number line.
- The next fraction bar is the same length as the third section on the number line.
- The next fraction bar is the same length as the fourth section on the number line.
- This means that the four fraction bars are equal to 1 whole.
- This also means that the four fraction bars are equal to $\frac{4}{4}$ on the number line.
- The end of the third fraction bar marked $\frac{1}{4}$ is at the same place as the end of the third section after 0 and $\frac{0}{4}$ on the number line.

So, Point C represents the fraction $\frac{3}{4}$ on this number line. This means that Point C is located at $\frac{3}{4}$ of the distance on the number line between 0 or $\frac{0}{4}$ and 1 or $\frac{4}{4}$.

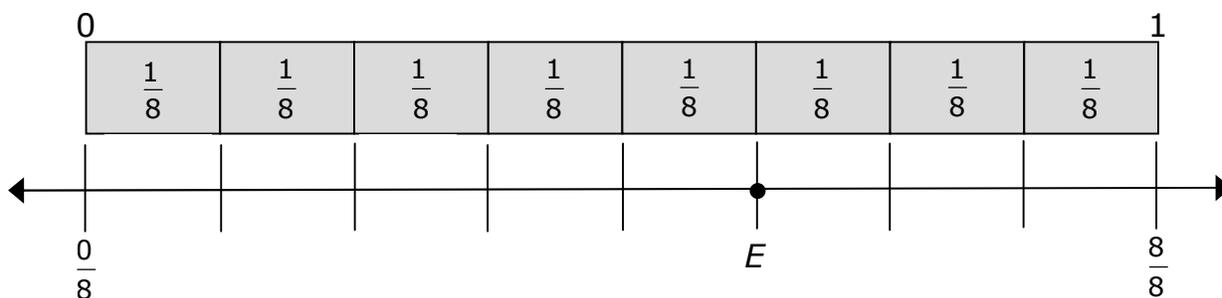
EXAMPLE 4: The model shows six fraction bars above a number line. Point D is located on the number line. What fraction does Point D represent?



- The number line is divided into 6 equal sections.
- There are 6 equal fraction bars above the number line.
- The first fraction bar is the same length as the first number line section, so the first section on the number line is $\frac{1}{6}$ of the length of the number line.
- The next fraction bar is the same length as the second number line section, so the second section is $\frac{2}{6}$ of the length of the number line.

So, Point D represents the fraction $\frac{2}{6}$ on this number line. This means that Point D is located at $\frac{2}{6}$ of the distance on the number line between 0 or $\frac{0}{6}$ and 1 or $\frac{6}{6}$.

EXAMPLE 5: The model shows eight fraction bars above a number line. Point E is located on the number line. What fraction does Point E represent?



- The number line is divided into 8 equal sections.
- There are 8 equal fraction bars above the number line.
- The first fraction bar is the same length as the first number line section, so the first section on the number line is $\frac{1}{8}$ of the length of the number line.
- The next fraction bar is the same length as the second number line section, so the second section is $\frac{2}{8}$ of the length of the number line.

- The next fraction bar is the same length as the third number line section, so the third section is $\frac{3}{8}$ of the length of the number line.
- The next fraction bar is the same length as the fourth number line section, so the fourth section is $\frac{4}{8}$ of the length of the number line.
- The next fraction bar is the same length as the fifth number line section, so the fifth section is $\frac{5}{8}$ of the length of the number line.

So, Point E represents the fraction $\frac{5}{8}$ on this number line. This means that Point E is located at $\frac{5}{8}$ of the distance on the number line between 0 or $\frac{0}{8}$ and 1 or $\frac{8}{8}$.