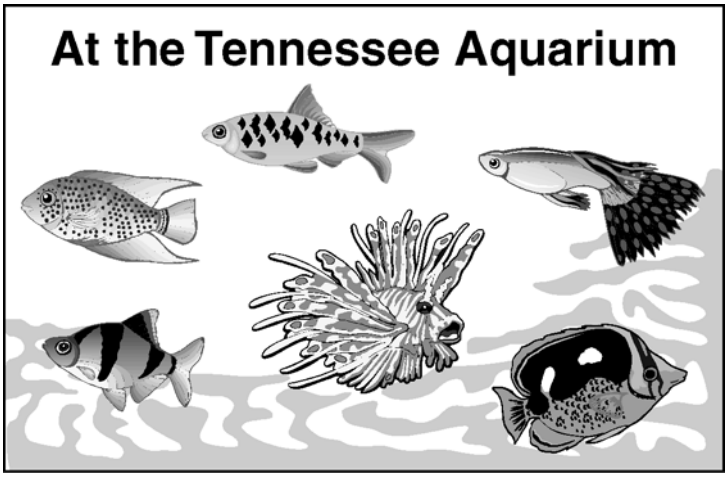
SITES-M Mathematics Challenge



Level: Grade Two

Standard: Number and Operations

Learning Target: Focus on System of Tens

Grade Level Expectations

GLE 0206.2.1 Understand and use place value concepts to 1000.
GLE 0206.2.2 Understand and use the base-ten numeration system.

Checks for Understanding

0206.2.4 Recognize that place-value notation represents the sums of multiples of powers of ten.

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens
At the Tennessee Aquarium

The purpose of the Mathematics Challenges is to provide opportunities for students to develop and demonstrate understanding of important mathematical concepts and standards. Each Challenge includes a set of tasks that require higher-order thinking skills. Because these types of tasks may be new for students and they will have varying levels of understanding, the student responses will vary. The Challenges and guiding questions were designed to help teachers plan their implementation and elicit, analyze, and act on evidence of student understanding.

You will be able to choose which Mathematics Challenge Packet to implement each month, according to the learning needs of your students and your teaching context. Each packet contains all the materials necessary to implement the Mathematics Challenge including a grade-appropriate Challenge, the Mathematics Challenge Meeting Protocol, and the Guiding Questions for Analyzing Student Responses to Mathematics Challenges.

For each Challenge, you will complete a six step process of planning, implementation, and analysis and reflection.

The Mathematics Challenge Process

Stage	Step	Task
Planning	Step 1.	Review the Mathematics Challenge Meeting Protocol
	Step 2.	Review and solve the Mathematics Challenge prior to your Professional Learning Community (PLC) meeting. Think about your responses to the guiding questions on the Meeting Protocol
	Step 3.	Hold your PLC meeting and discuss your responses to the Guiding Questions on the Meeting Protocol
Implementation	Step 4.	Implement the Mathematics Challenge with your class
Analysis and Reflection	Step 5.	For your own planning and documentation, respond to the Guiding Questions on the Analyzing Student Responses Protocol
	Step 6.	To help us improve the Challenges and to provide recommendations for teachers implementing them in future years, complete the Mathematics Challenge Feedback Log and provide copies of all student work to the Assessment Coordinator

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Grade 2–Focus on System of Tens
At the Tennessee Aquarium

Mathematics Challenge Meeting Protocol

Each month, your Professional Learning Community will meet to discuss the implementation of one Mathematics Challenge. In preparation for your monthly meeting, please print and review this month's Mathematics Challenge, solve all tasks within the Challenge, and think about the guiding questions below. These questions will be used to facilitate a group discussion regarding the implementation of the upcoming Mathematics Challenge.

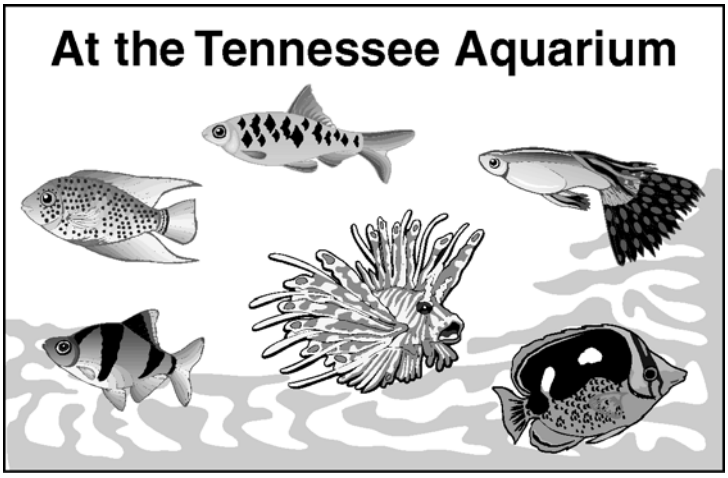
Guiding Questions for Implementing the Mathematics Challenges

1. What is the title of the Challenge that you will use this month?
2. What skills or standards is this Challenge measuring?
3. Where does this Challenge fit within your curriculum? Within which unit?
4. At what point during the unit will you administer this Challenge (e.g., At the beginning of a unit to determine what students do or do not know, at the end of a unit to assess what students have or have not learned, in the middle of a unit to determine where to go next instructionally)?
5. How will your students complete this Challenge (e.g., individually, one-on-one, in small groups, as a class)? Why?
6. Are there any prerequisite skills, common misunderstandings, or vocabulary needs that you will have to address? What are they?
7. What difficulties do you anticipate your students will have with the Challenge? How will you address them?
8. Are these skills and difficulties different for special needs students, ELL students, etc.? How? Will you do anything different for these students? What?
9. How will you evaluate student responses (e.g., grade responses with the provided rubric, scan responses to identify common mistakes/misconceptions, have students evaluate one another's responses, have students evaluate their own response)?
10. What will student responses to this Challenge tell you about student understanding?
11. How might you use this evidence of student understanding to adapt your teaching and learning?
12. What other materials, resources, or support might you need? Where can you get them?
13. How can your colleagues assist you in the analysis of student understanding?
14. What other questions or concerns do you have about this Mathematics Challenge?

After you have implemented the challenge with your class, be sure to respond to the Guiding Questions on the Analyzing Student Responses Protocol.

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens



Standard: Number and Operations

Learning Target: Focus on System of Tens

Claims:
Students should understand and be able to explain or demonstrate how to:

- ✓ Understand and use place-value concepts to 1000;
- ✓ Understand and use the base-ten numeration system;
- ✓ Recognize that place-value notation represents the sums of multiples of powers of ten.

Task Preparation:
Each student will need a copy of the Student Response Sheet.

Stimulus Cards (Drawing or Word Description):
None

Manipulatives/Supplies:
Pencils

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens

Cues/Directions:

Distribute student response sheets. Students should be directed to look carefully at each figure. Allow students time to answer.

Instruct students to follow along as you read aloud and say: **The Brown Family spent the day at the Tennessee Aquarium. They saw fish, otters, reptiles, and penguins.**

1. Say: **The table below shows how many of these animals are at the aquarium. (TEACHER NOTE:** Have students look at the table.**) In the table below, list the numbers of each animal in order beginning with the smallest. Then fill in the correct place value for each digit in the number. (TEACHER NOTE:** Have students complete the table. **)**

2. **There are about 50 sharks at the aquarium. Amy Brown says that the number of sharks is equal to the addition problem 5 tens + 0 ones. Her brother Will says the number of sharks is really 5 hundreds + 0 tens. Who is right? (TEACHER NOTE:** Have students check the correct box. **) How do you know? (TEACHER NOTE:** Students should write their explanation in the box.**)**

3. **There are 1,245 butterflies in the butterfly exhibit at the aquarium. Amy says you can make 12 groups of 100 butterflies. Will says you can make 2 groups of 100 butterflies and 1 group of 1,000 butterflies. Who is right? (TEACHER NOTE:** Have students check the correct box.**) How do you know? (TEACHER NOTE:** Students should write their explanation in the box.**)**

4. **There were 3,082 people who went to the aquarium that day. Circle <u>all</u> the addition problems below that are equal to 3,082. (TEACHER NOTE:** Have students circle the correct choices that are equal to 3,082 **) Show why your choices equal 3,082. (TEACHER NOTE:** Have students write equations for each choice they circled that shows each equals 3,082 **)**

5. **One of the big tanks at the Aquarium has 260 fish. The people who work at the aquarium want to put the fish into medium and small tanks so people can see them better. A medium tank holds 100 fish. A small tank holds 10 fish. Explain one way to put the 260 fish into medium and small tanks. (TEACHER NOTE:** Students should write their explanation in the box.**) Explain a different way to put the 260 fish into medium and small tanks. (TEACHER NOTE:** Students should write their explanation in the box.**) Which way do you think is better for people to see the fish? Explain why is it better. (TEACHER NOTE:** Students should write their explanation in the box.**)**

6. **Look at the Number Tank below. (TEACHER NOTE:** Students should look at the numbers shown in the tank.**) What is the <u>biggest</u> number you can make using any 4 of the numbers from the Number Tank above? (TEACHER NOTE:** Students should write their correct answer on the line.**) How many groups of 1,000 are in your number? (TEACHER NOTE:** Students should write their correct answer on the line.**) How many groups of 100 are in your number? (TEACHER NOTE:** Students should write their correct answer on the line.**) How many groups of 10 are in your number? (TEACHER NOTE:** Students should write their correct answer on the line.**) Put each number from the Number Tank into a space below. Make an addition problem so that when you add, you get the <u>biggest</u> possible answer. (TEACHER NOTE:** Students should write the correct numbers from the tank in each box, this might be a stretch for some students.**) How do you know you have the <u>biggest</u> possible answer? (TEACHER NOTE:** Students should write their explanation in the box.**)**

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens

Student Response Sheet

At the Tennessee Aquarium

Name: _____ **Date:** _____

The Brown Family spent the day at the Tennessee Aquarium. They saw fish, otters, reptiles, and penguins.

1. **The table below shows how many of these animals are at the aquarium.**

Animal	Number at the Aquarium
 **Fish**	**7,824**
 **Otters**	**3**
 **Reptiles**	**697**
 **Penguins**	**20**

In the table below, list the numbers of each animal in order beginning with the smallest. Then fill in the correct place value for each digit in the number.

Number	Thousands	Hundreds	Tens	Ones

2. There are about 50 sharks at the aquarium. Amy Brown says that the number of sharks is equal to the addition problem

5 tens + 0 ones.

Her brother Will says the number of sharks is really

5 hundreds + 0 tens.

Who is right? ☐ **Amy** ☐ **Will**

How do you know?

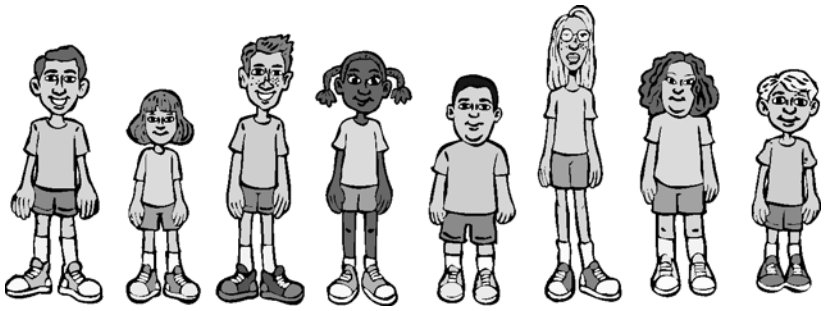
3. There are 1,245 butterflies in the butterfly exhibit at the aquarium.

Amy says you can make 12 groups of 100 butterflies.

Will says you can make 2 groups of 100 butterflies and 1 group of 1,000 butterflies.

Who is right? ☐ **Amy** ☐ **Will**

How do you know?



4. There were 3,082 people who went to the aquarium that day. Circle <u>all</u> the addition problems below that are equal to 3,082.

a. 3 hundreds + 8 tens + 2 ones

b. 30 thousands + 8 hundreds + 2 tens

c. 3 thousands + 8 tens + 2 ones

d. 30(100) + 82(1)

e. 3(1000) + 0(100) + 8(10) + 2(1)

Show why your choices equal 3,082.

5. One of the big tanks at the Aquarium has 260 fish. The people who work at the aquarium want to put the fish into medium and small tanks so people can see them better.

A medium tank holds 100 fish.

A small tank holds 10 fish.

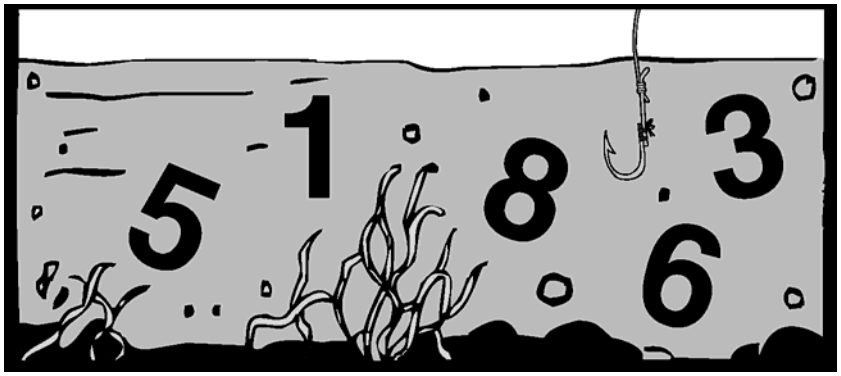
a. Explain one way to put the 260 fish into medium and small tanks.

b. Explain a different way to put the 260 fish into medium and small tanks.

c. Which way do you think is better for people to see the fish? Explain why is it better.

6. Look at the Number Tank below.

Number Tank



a. What is the <u>biggest</u> number you can make using any 4 of the numbers from the Number Tank above?

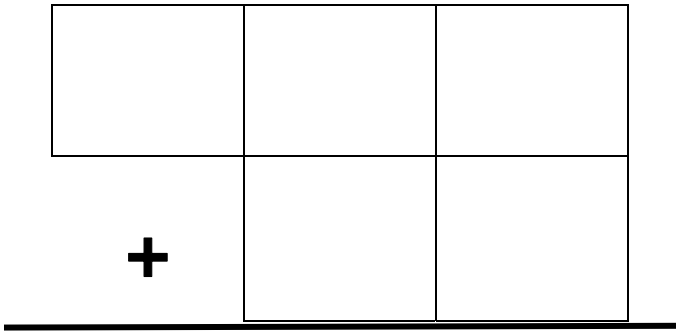
_____

How many groups of 1,000 are in your number? _____

How many groups of 100 are in your number? _____

How many groups of 10 are in your number? _____

b. Put each number from the Number Tank into a space below. Make an addition problem so that when you add, you get the <u>biggest</u> possible answer.



How do you know you have the <u>biggest</u> possible answer?

Learning and Teaching Considerations

Task 1:

A) Be sure that students understand that the positions of digits determine the value of those digits within the number.

B) If a student says or writes, "I just know," prompt him or her by saying something like "I'm glad you know, but it's important in math to be able to explain your answers so other people can understand what you're thinking."

C) If a student says or writes, "I don't know," say something positive like "Let's start with what you do know about this problem." Students often know more than they think or say, and encouraging them to vocalize or write about that knowledge is all they need.

D) The teacher could encourage students to use manipulatives such as base ten blocks or unifix cubes to explore groups of ten (and tens of tens). The manipulatives can be used by students as a tool to reason and make sense of our base ten system.

E) Be sure that students understand that there are patterns to the way that numbers in our number system are formed. For example, in base ten, each decade has a symbolic pattern reflective of the 0-to-9 sequence. There are ten possible symbols that can be used as a digit in each place. When counting objects, each object can be represented with a symbol (from 0 to 9). When reaching ten objects, they are grouped together, and symbols already used as digits are used to represent the number of groups of ten. The same symbols are repeated when representing tens of tens.

Task 2:

A) Students may explain that Amy's answer equals 50 but Will's answer equals 500.

B) Students may show multiplication of 5 by 10 and show multiplication of 5 by 100.

C) Students may use mental math by seeing five sets of ten and may recognize without counting that the total is 50. The teacher can encourage them to draw or write what they are thinking.

Task 3:

A) Be sure that students understand that numbers can be represented and taken apart in different ways using groupings of ones, tens, hundreds, and thousands. There are equivalent representations of numbers.

B) Students may show multiplication of 12 by 100 and show multiplication of 2 by 100 or use another strategy to show that both answers will add to 1,200.

C) Students may have the misconception that 12 groups of 100 butterflies are equal to 120 (working with the digits, rather than the concept) or equal to 112 (adding the two numbers together, rather than counting them as 12 groups of 100).

Task 4:

A) Students may provide an explanation using expanded notation (multiplication and addition).

B) Students may show multiplication and addition for each of the 5 choices.

C) Students may have the misconception that the parentheses do not represent multiplication and only choose c as the correct answer.

Task 5:

A) Students may show multiplication by 100 and multiplication by 10 to get sums to add to 260.

B) Be sure that students are able to connect their pictures, numbers, and words to each other.

C) Students may say that 3 medium tanks could be used with only 60 fish in one. If so, encourage them to discuss that in part (c). There is no single correct explanation for part (c), as long as the student refers to parts (a) and (b).

D) Students may answer by creating their own pictures, by using words or symbols (such as the addition symbol), by using numbers, or by using manipulatives. The teacher also can encourage them to link these strategies and/or representations to each other as a way to provide a convincing solution.

Task 6:

A) Students may explain that the biggest numbers need to go into the biggest place values and the smallest numbers need to go into the smallest place values.

B) Students may show work by adding different combinations of the 5 digits (e.g., using a trial and error approach).

C) Be sure that students understand that the positions of digits determine the value of those digits within the number.

D) The teacher could encourage students to use manipulatives such as base ten blocks or unifix cubes to explore groups of ten (and tens of tens). The manipulatives can be used by students as a tool to reason and make sense of our base ten system.

Name: ANSWER KEY Date: _____

The Brown Family spent the day at the Tennessee Aquarium. They saw fish, otters, reptiles, and penguins.

1. The table below shows how many of these animals are at the aquarium.

Animal	Number at the Aquarium
 Fish	7,824
 Otters	3
 Reptiles	697
 Penguins	20

In the table below, list the numbers of each animal in order beginning with the smallest. Then fill in the correct place value for each digit in the number.

Number	Thousands	Hundreds	Tens	Ones
3				3
20			2	0
697		6	9	7
7,824	7	8	2	4

2. There are about 50 sharks at the aquarium. Amy Brown says that the number of sharks is equal to the addition problem

5 tens + 0 ones.

Her brother Will says the number of sharks is really

5 hundreds + 0 tens.

Who is right? [X] Amy [ ] Will

How do you know?

$5 \times 10 = 50$
$0 \times 1 = 0$
$50 + 0 = 50$

WILL IS NOT CORRECT
BECAUSE

$5 \times 100 = 500$
$0 \times 10 = 0$
$500 + 0 = 500$

3. There are 1,245 butterflies in the butterfly exhibit at the aquarium.

   Amy says you can make 12 groups of 100 butterflies.

   Will says you can make 2 groups of 100 butterflies and 1 group of 1,000 butterflies.

Who is right? [X] Amy [X] Will

How do you know?

AMY: 12 x 100 = 1,200

WILL: 2 x 100 = 200
AND 200 + 1,000 = 1,200

4. There were 3,082 people who went to the aquarium that day. Circle all the addition problems below that are equal to 3,082.

a. 3 hundreds + 8 tens + 2 ones

b. 30 thousands + 8 hundreds + 2 tens

c. 3 thousands + 8 tens + 2 ones

d. 30(100) + 82(1)

e. 3(1000) + 0(100) + 8(10) + 2(1)

Show why your choices equal 3,082.

c. $3(1000) = 3000$
$8(10) = 80$
$2(1) = 2$
$3,082$

e. 3000
0
80
2
$3,082$

d. $30(100) = 3000$
$82(1) = 82$
$3,082$

5. One of the big tanks at the Aquarium has 260 fish. The people who work at the aquarium want to put the fish into medium and small tanks so people can see them better.

A medium tank holds 100 fish.

A small tank holds 10 fish.

a. Explain one way to put the 260 fish into medium and small tanks.

2 MEDIUM TANKS 2(100) = 200
6 SMALL TANKS 6(10) = 60

200 + 60 = 260

b. Explain a different way to put the 260 fish into medium and small tanks.

ANSWERS CAN VARY!

1 MEDIUM TANK 1(100) = 100
16 SMALL TANKS 16(10) = 160

100 + 160 = 260

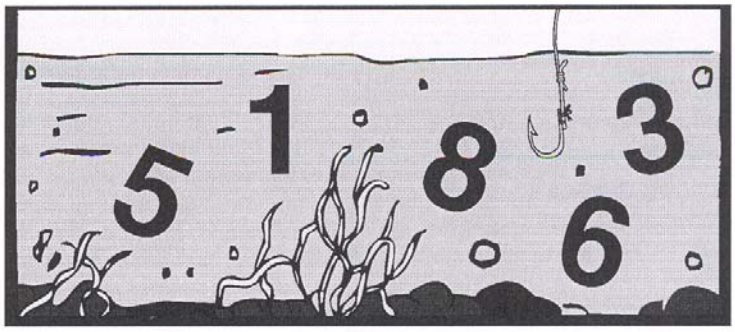
26 SMALL TANKS ALSO WORKS.

c. Which way do you think is better for people to see the fish? Explain why is it better.

THERE IS NO INCORRECT ANSWER AS LONG AS STUDENT REFERS TO ANSWERS IN A + B.

6. Look at the Number Tank below.

Number Tank



a. What is the biggest number you can make using any 4 of the numbers from the Number Tank above?

8,653

How many groups of 1,000 are in your number? 8

How many groups of 100 are in your number? 6 (OR 86)

How many groups of 10 are in your number? 5 (OR 865)

b. Put each number from the Number Tank into a space below. Make an addition problem so that when you add, you get the biggest possible answer.

8	5	1
+	6	3
9	1	4

OR

853 + 61

863 + 51

861 + 53

How do you know you have the <u>biggest</u> possible answer?

8 IS THE BIGGEST NUMBER, SO IT SHOULD GO IN THE BIGGEST PLACE.

THE NEXT BIGGEST NUMBERS SHOULD GO IN THE NEXT BIGGEST PLACE.

AND THE SMALLEST NUMBERS SHOULD GO IN THE SMALLEST PLACE.

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens
Rubric

CATEGORY	4	3	2	1
Mathematical concepts	**Response shows complete understanding of the mathematical concepts used to solve the problem(s).**	**Response shows substantial understanding of the mathematical concepts used to solve the problem(s).**	**Response shows some understanding of the mathematical concepts needed to solve the problem(s).**	**Response shows very limited understanding of the underlying concepts needed to solve the problem(s), OR the response is not written.**
	Response shows evidence in ALL of the following tasks. **Task 1**. Student lists the numbers in order of 3, 20, 697, and 7,824. Student places digits in correct place value, as shown on answer sheet. **Task 2**. Student answers Amy and explains that Amy's answer equals 50 but Will's answer equals 500. **Task 3**. Student answers that both are correct and shows that both groupings give 1,200. **Task 4**. Student answers c, d, e, and nothing else. Student shows that each one equals 3,082. **Task 5**. Student gives a correct way to divide the fish into two tanks in part (a) and gives a different way to do it in part (b). Answer to part (c) is reasonable based on answers to (a) and (b). **Task 6**. In part (a) student answers 8,653 and there are 8 groups of 1,000. Student answers that there are 6 (or 86) groups of 100 and 5 (or 865) groups of 10. In part (b) student places digits so that sum is 914. In part (c) student explains why that is the greatest sum.	Response shows evidence in only 5 of the tasks described in category 4.	Response shows evidence in only 4 of the tasks described in category 4.	Response shows evidence in 3 or fewer of the tasks described in category 4.

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens
Rubric

CATEGORY	4	3	2	1
Strategy and procedures	**Student typically uses an efficient and effective strategy to solve the problem(s).**	**Student typically uses an effective strategy to solve the problem(s).**	**Student sometimes uses an effective strategy to solve the problem(s), but not consistently.**	**Student rarely uses an effective strategy to solve the problem(s).**
	Response shows evidence in ALL of the following tasks. **Task 2**. Student shows multiplication of 5 by 10 and shows multiplication of 5 by 100. **Task 3**. Student shows multiplication of 12 by 100 and shows multiplication of 2 by 100. **Task 4**. Student shows multiplication and addition somewhere on paper for each of the 5 choices. **Task 5**. Student shows multiplication by 100 and multiplication by 10 to get sums to add to 260. **Task 6**. Student shows work in adding different combinations of the 5 digits.	Response shows evidence in only 4 of the tasks described in category 4.	Response shows evidence in only 3 of the tasks described in category 4	Response shows evidence in 2 or fewer of the tasks described in category 4.

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens
Rubric

CATEGORY	4	3	2	1
Explanation and communication	**Explanation is detailed and clear; uses appropriate terminology and/or notation.**	**Explanation is clear; uses some appropriate terminology and/or notation.**	**Explanation is a little difficult to understand, but includes critical components; shows little use of appropriate terminology and/or notation.**	**Explanation is difficult to understand, is missing several components, and does not use or include appropriate terminology and/or notation.**
	Response shows evidence in ALL of the following tasks. **Task 2**. Student explains that Amy's answer will add to 50 but Will's answer will add to 500. **Task 3**. Student explains that both answers will add to 1,200. **Task 4**. Student shows that choice c, d, and e will add to 3,082 and that choices a and b will not add to 3,082. **Task 5**. Student explains two different ways to put the fish into two tanks. Explanation should add to 260, but student might say that 3 medium tanks could be used with only 60 fish in one. If so, they should discuss that in part (c). There is no single correct explanation for part (c), as long as the student refers to parts (a) and (b). **Task 6**. Student explains that the biggest numbers need to go into the biggest place values and the smallest numbers need to go into the smallest place values.	Response shows evidence in ALL of the tasks, but may lack detail in task 6, such as not connecting the biggest digits with the biggest place values.	Response shows evidence in only 3 or 4 explanations as described in category 4.	Response shows evidence in 2 or fewer explanations as described in category 4.

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens
Rubric

CATEGORY	4	3	2	1
Mathematical accuracy	**All or almost all of the steps and solutions have no mathematical errors.**	**Most of the steps and solutions have no mathematical errors.**	**Some of the steps and solutions have no mathematical errors.**	**Few of the steps and solutions have no mathematical errors.**
	Student provides correct answers for ALL of the following tasks. **Task 1**. Student places digits correctly in table, as shown on answer sheet. **Task 2**. Student answers Amy, shows that 5 times 10 equals 50, and that 5 times 100 does not equal 50. **Task 3**. Student answers Amy and Will and shows that both groupings equal 1,200. **Task 4**. Student answers c, d, e, and nothing else. **Task 5**. Student shows correct groupings in part (a) and part (b). **Task 6**. Student answers 8,653 in part (a) and gives correct groupings, as shown on answer sheet. In part (b) student is able to obtain a sum of 914.	Student provides correct answers for ALL of the tasks described in category 4, but cannot obtain a sum of 914 in task 6.	Student provides correct answers for only 4 or 5 of the tasks described in category 4.	Student provides correct answers for 3 or fewer of the tasks described in category 4.

Scoring notes checklist

Task	Check Yes	Category
Task 1		
Student lists the numbers in order of 3, 20, 697, and 7,824. Student places digits in correct place value, as shown on answer sheet.		Concept
Student places digits correctly in table, as shown on answer sheet.		Accuracy
Task 2		
Student answers Amy and explains that Amy's answer equals 50 but Will's answer equals 500.		Concept
Student shows multiplication of 5 by 10 and shows multiplication of 5 by 100.		Strategy
Student explains that Amy's answer will add to 50 but Will's answer will add to 500.		Explanation
Student answers Amy, shows that 5 times 10 equals 50, and that 5 times 100 does not equal 50.		Accuracy
Task 3		
Student answers that both are correct and shows that both groupings give 1,200.		Concept
Student shows multiplication of 12 by 100 and shows multiplication of 2 by 100.		Strategy
Student explains that both answers will add to 1,200.		Explanation
Student answers Amy and Will and shows that both groupings equal 1,200.		Accuracy
Task 4		
Student answers c, d, e, and nothing else. Student shows that each one equals 3,082.		Concept
Student shows multiplication and addition somewhere on paper for each of the 5 choices.		Strategy
Student shows that choice c, d, and e will add to 3,082 and that choices a and b will not add to 3,082.		Explanation
Student answers c, d, e, and nothing else.		Accuracy

Task 5		
Student gives a correct way to divide the fish into two tanks in part (a) and gives a different way to do it in part (b). Answer to part (c) is reasonable based on answers to (a) and (b).		Concept
Student shows multiplication by 100 and multiplication by 10 to get sums to add to 260.		Strategy
Student explains two different ways to put the fish into two tanks. Explanation should add to 260, but student might say that 3 medium tanks could be used with only 60 fish in one. If so, they should discuss that in part (c). There is no single correct explanation for part (c), as long as the student refers to parts (a) and (b).		Explanation
Student shows correct groupings in part (a) and part (b)		Accuracy
Task 6		
In part (a) student answers 8,653 and there are 8 groups of 1,000. Student answers that there are 6 (or 86) groups of 100 and 5 (or 865) groups of 10. In part (b) student places digits so that sum is 914. In part (c) student explains why that is the greatest sum.		Concept
Student shows work in adding different combinations of the 5 digits.		Strategy
Student explains that the biggest numbers need to go into the biggest place values and the smallest numbers need to go into the smallest place values.		Explanation
Student answers 8,653 in part (a) and gives correct groupings, as shown on answer sheet. In part (b) student is able to obtain a sum of 914.		Accuracy

SITES-M Mathematics Challenge

Grade 2–Focus on System of Tens

Analyzing Student Responses Protocol

The purpose of the Mathematics Challenges is to provide opportunities for students to develop and demonstrate understanding of important mathematical concepts and standards. They include extended responses, open-ended tasks, and tasks that require higher-order thinking skills. Because these types of tasks may be novel for students and they will have varying levels of understanding, the student responses will vary.

The guiding questions below were designed to assist you in analyzing your class' response to the Challenge and determining appropriate next steps for your teaching and learning. Responses to these questions are for your reflection and documentation and will not be collected.

Guiding Questions for Analyzing Student Responses to the Mathematics Challenges

1. When completing the Challenge, what did your students do well? How do you know?

2. When completing the Challenge, what did your students struggle with? How do you know?

3. When your students completed the Challenge, did they implement multiple correct solutions strategies? What insightful approaches to problem solving did you observe?

4. What, if any, patterns (e.g., common errors/misconceptions) did you observe across your student responses?

5. What questions or concerns did your students have when working through this Challenge or a particular task? Are these things you should address for the class as a whole?

6. What, if any, feedback did you provide to your class? How did you provide it?

7. What did you learn about your students' mathematical understanding based on their responses to this Challenge?

Reminders:

1) After you have completed the Challenge with your class and responded to these Guiding Questions for Analyzing Student Responses, please complete the Challenge Feedback Log. A link to this Log is e-mailed to you each month. Responses will be used to improve the Challenges and to provide recommendations for teachers implementing the Challenges in future years.

2) Please provide copies of all student work to the Assessment Coordinator.