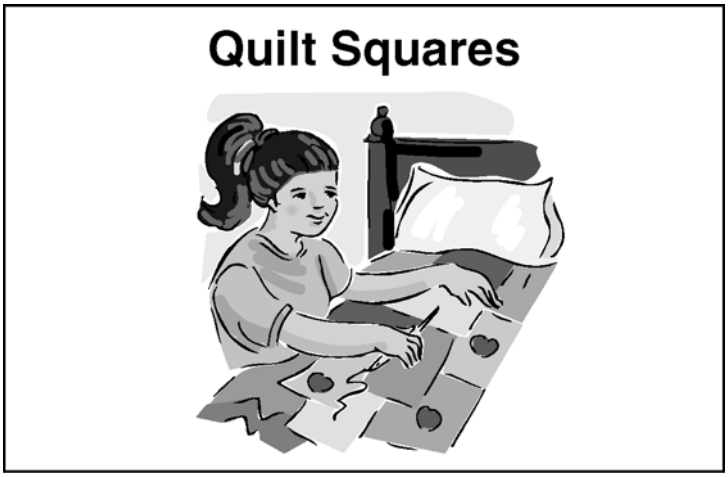
SITES-M Mathematics Challenge



Level: Grade Two

Standard: Geometry and Measurement

Learning Target: Focus on Measurement

Checks for Understanding

0206.4.4	Estimate, measure, and calculate length to the nearest unit.
0206.4.5	Use rulers to measure the lengths of sides and diagonals of common 2-dimensional figures and polygons.
0206.4.6	Understand the inverse relationship between the size of a unit and the number of units used in a particular measurement.

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement
Quilt Squares

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

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement
Quilt Squares
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 Measurement

Quilt Squares

Standard: Geometry and Measurement

Learning Target: Focus on Measurement

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

- ✓ Estimate, measure, and calculate length to the nearest unit;
- ✓ Use rulers to measure the lengths of sides and diagonals of common 2-dimensional figures and polygons;
- ✓ Understand the inverse relationship between the size of a unit and the number of units used in a particular measurement.

Task Preparation:
Each student will need copies of the Student Response Sheet, a copy of the 4 Design Sheets at the end of the challenge, a pencil, and a ruler (inches).

Stimulus Cards (Drawing or Word Description):
Each student should have a copy of the 4 Design Sheets at the end of the challenge.

Manipulatives/Supplies:
Copies of the Student Response Sheet and the 4 Design Sheets
Pencils
Rulers (inches)

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement

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

1. Instruct students to follow along as you read aloud and say: **The students in Ms. Arroyo's art class are creating designs to use as patterns for a quilt. The designs are made of squares and diagonals. Look at Design A. Use your ruler to measure the following to the nearest inch. The length of one side of the big square is "blank" inches. (TEACHER NOTE:** Students should write their correct answer on the line.**) The length of one side of the shaded square is "blank" inches. (TEACHER NOTE:** Students should write their correct answer on the line.**). If you measure one side of the shaded square in centimeters, will the answer be a number that is greater than, less than, or equal to the number you got when you measured in inches? (TEACHER NOTE:** Have students check the correct box.**) How do you know? (TEACHER NOTE:** Students should write their explanation in the box.**)**

2. **Look at Design B. Without measuring, do you think the dashed diagonal line is longer, shorter, or equal to the length of one side of the square? (TEACHER NOTE:** Have students check the correct box.**) How do you know? (TEACHER NOTE:** Students should write their explanation in the box.**)**

3. **Use your ruler to measure one side of the square in Design B. How many inches long is one side? (TEACHER NOTE:** Students should write their correct answer on the line.**) Now use your ruler to measure the dashed diagonal in Design B to the nearest inch. About how many inches long is the diagonal? (TEACHER NOTE:** Students should write their correct answer on the line.**) Is your actual measurement of the diagonal a little greater, a little less, or exactly this number? (TEACHER NOTE:** Have students check the correct box.**)**

4. **Look at Design C. Use your ruler to measure one side of a small square in Design C. How many inches long is one side? (TEACHER NOTE:** Students should write their correct answer on the line.**) Now use your ruler to measure the dashed diagonal in Design C to the nearest inch. About how many inches long is the diagonal? (TEACHER NOTE:** Students should write their correct answer on the line.**) Is your actual measurement of the diagonal a little greater, a little less, or exactly this number? (TEACHER NOTE:** Have students check the correct box.**)**

5. **Now look at Design D. Use your ruler to measure one side of one of the <u>smallest</u> squares in design D. How many inches long is one side? (TEACHER NOTE:** Students should write their correct answer on the line.**) Now use your ruler to measure the dashed diagonal in Design D to the <u>nearest inch</u>. <u>About</u> how many inches long is the diagonal? (TEACHER NOTE:** Students should write their correct answer on the line.**) Is your actual measurement of the diagonal a little greater, a little less, or exactly this number? (TEACHER NOTE:** Have students check the correct box.**)**

6. **In Design D, if you put 2 diagonals together to make a line, how long do you think that line would be? (TEACHER NOTE:** Students should write their correct answer on the line.**) Why do you think that? (TEACHER NOTE:** Students should write their explanation in the box.**)**

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement

TSM10004

SITES-M Mathematics Challenge
Grade 2–Focus on Measurement

Student Response Sheet

Quilt Squares

Name: _____ **Date:** _____

The students in Ms. Arroyo's art class are creating designs to use as patterns for a quilt. The designs are made of squares and diagonals.

1. **Look at Design A.**

   a. **Use your ruler to measure the following to the <u>nearest inch</u>.**

   The length of one side of the <u>big</u> square is

   _____ **inches.**

   The length of one side of the <u>shaded</u> square is

   _____ **inches.**

b. If you measure one side of the shaded square in centimeters, will the answer be a number that is greater than, less than, or equal to the number you got when you measured in inches?

Check one:

- ☐ **Greater than**
- ☐ **Less than**
- ☐ **Equal to**

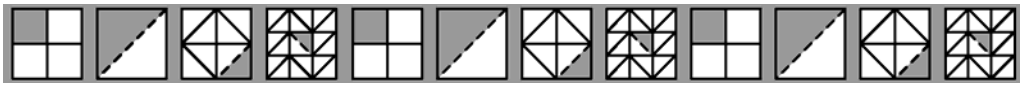
How do you know?

2. Look at Design B. <u>Without measuring</u>, do you think the dashed diagonal line is longer, shorter, or equal to the length of one side of the square?

Check one:

- ☐ **Longer**
- ☐ **Shorter**
- ☐ **Equal**

How do you know?



3. Use your ruler to measure one side of the square in Design B. How many inches long is one side?

_____ **inches**

Now use your ruler to measure the dashed diagonal in Design B to the <u>nearest inch</u>.

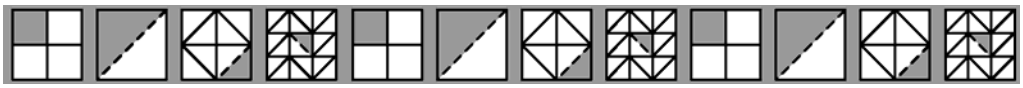
<u>About</u> how many inches long is the diagonal?

_____ **inches**

Is your actual measurement of the diagonal a little greater, a little less, or exactly this number?

Check one:

- ☐ **A little greater**
- ☐ **A little less**
- ☐ **Exactly**



4. Look at Design C. Use your ruler to measure one side of a <u>small</u> square in Design C. How many inches long is one side?

_____ inches

Now use your ruler to measure the dashed diagonal in Design C to the <u>nearest inch</u>.

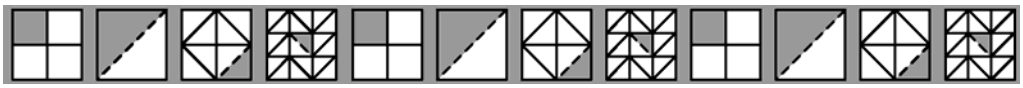
<u>About</u> how many inches long is the diagonal?

_____ inches

Is your actual measurement of the diagonal a little greater, a little less, or exactly this number?

Check one:

- ☐ **A little greater**
- ☐ **A little less**
- ☐ **Exactly**



5. Now look at Design D. Use your ruler to measure one side of one of the <u>smallest</u> squares in design D. How many inches long is one side?

_____ inches

Now use your ruler to measure the dashed diagonal in Design D to the <u>nearest inch</u>.

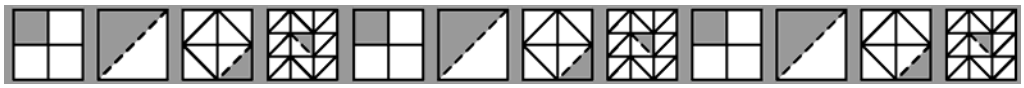
<u>About</u> how many inches long is the diagonal?

_____ inches

Is your actual measurement of the diagonal a little greater, a little less, or exactly this number?

Check one:

- ☐ **A little greater**
- ☐ **A little less**
- ☐ **Exactly**

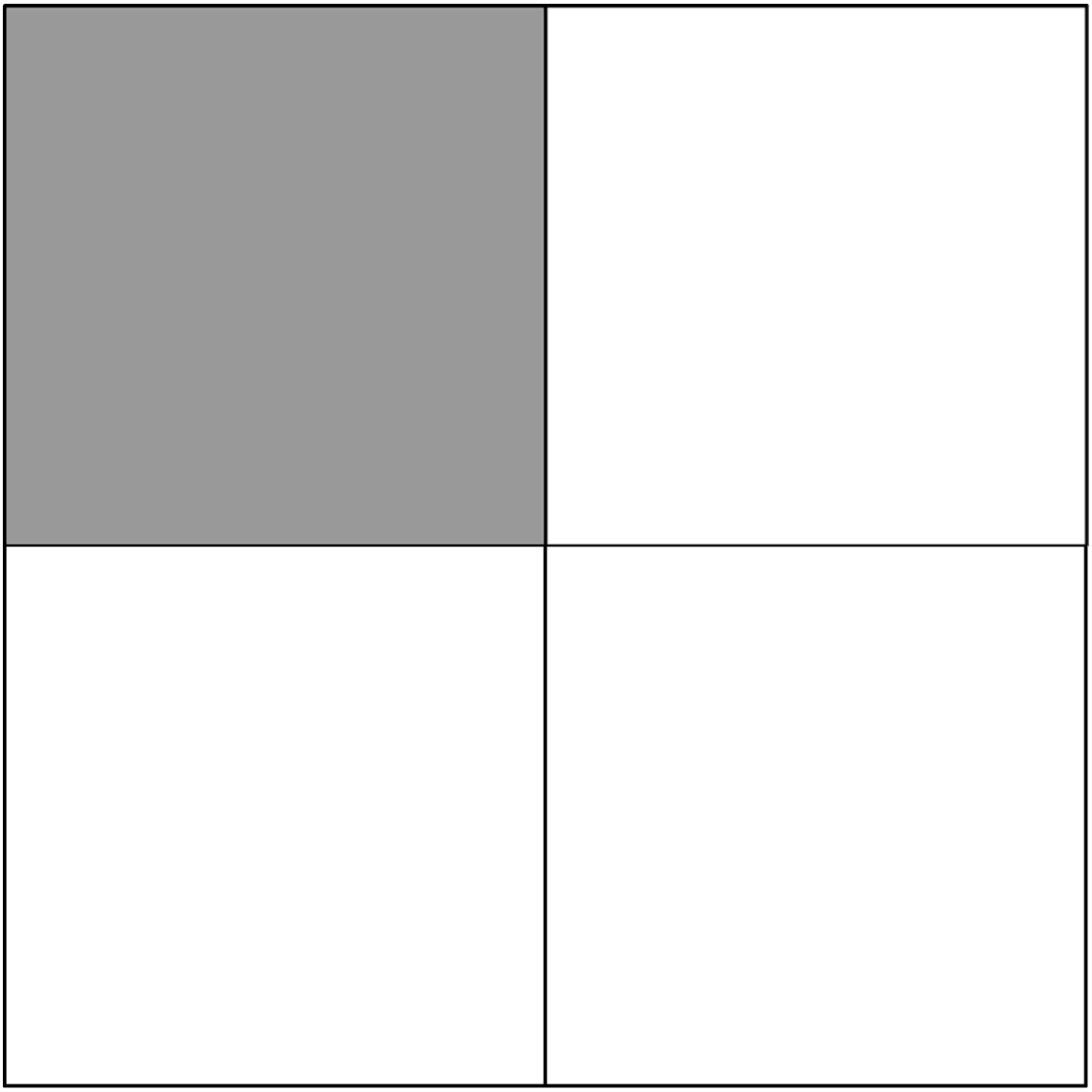


6. In Design D, if you put 2 diagonals together to make a line, how long do you think that line would be?

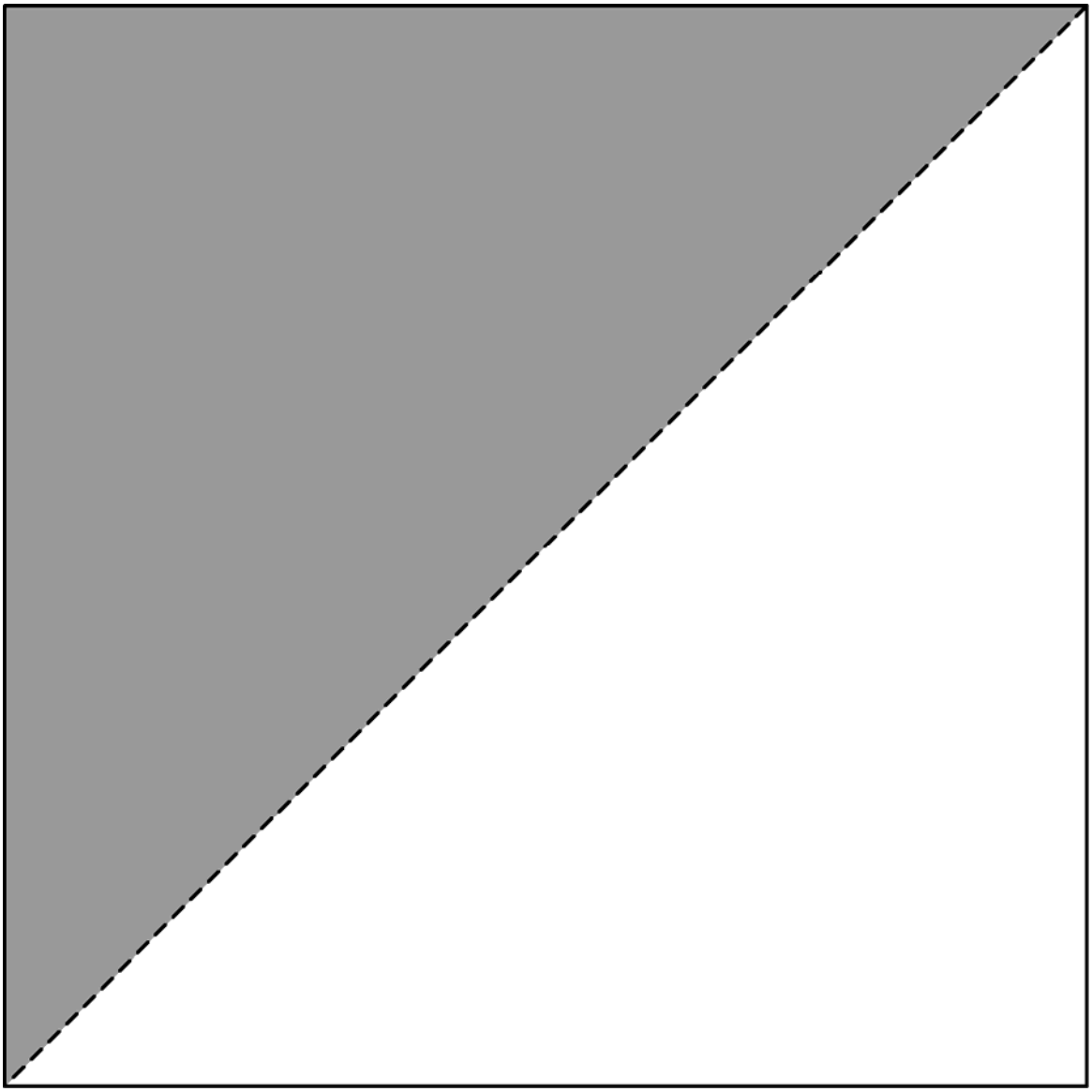
_____ inches

Why do you think that?

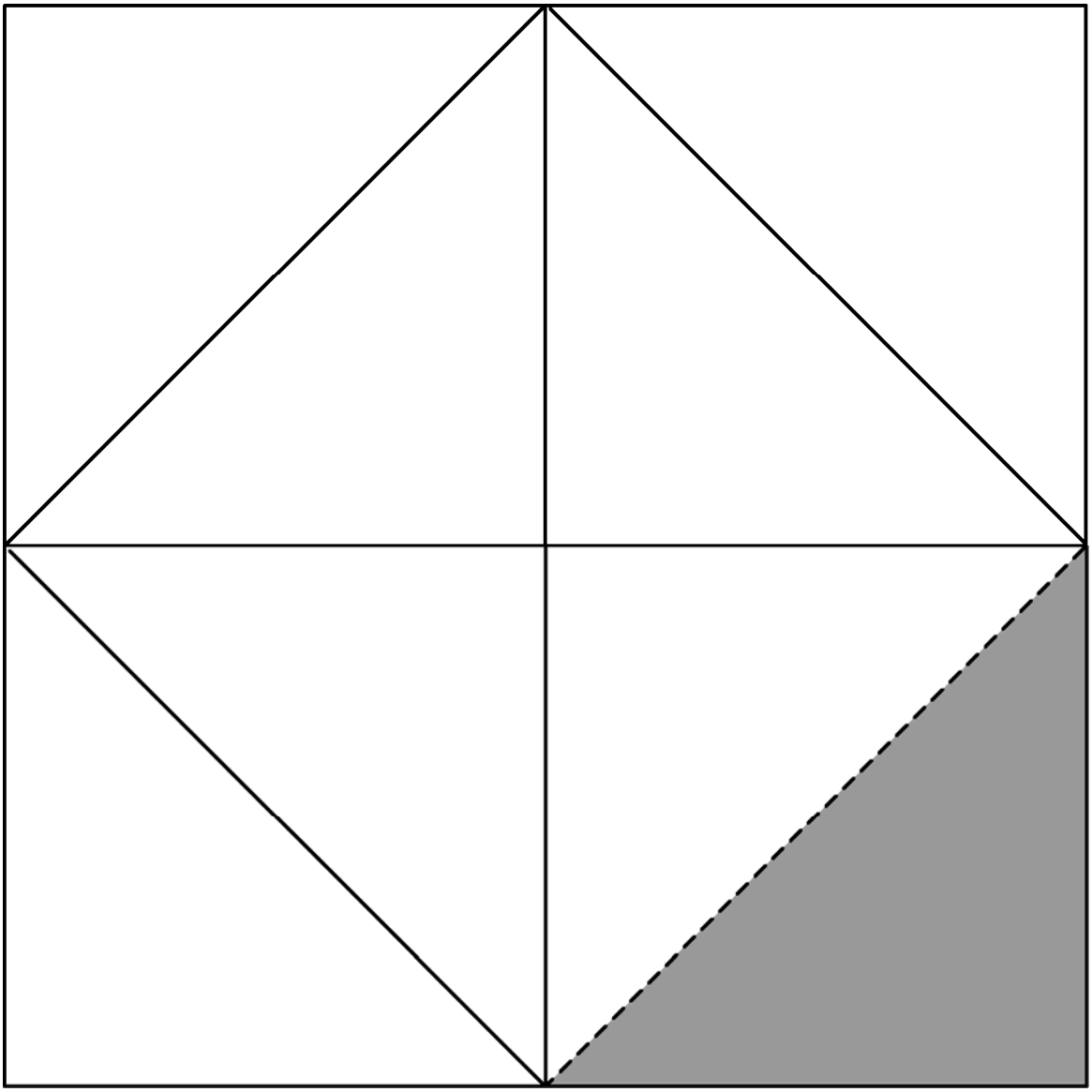
Design A



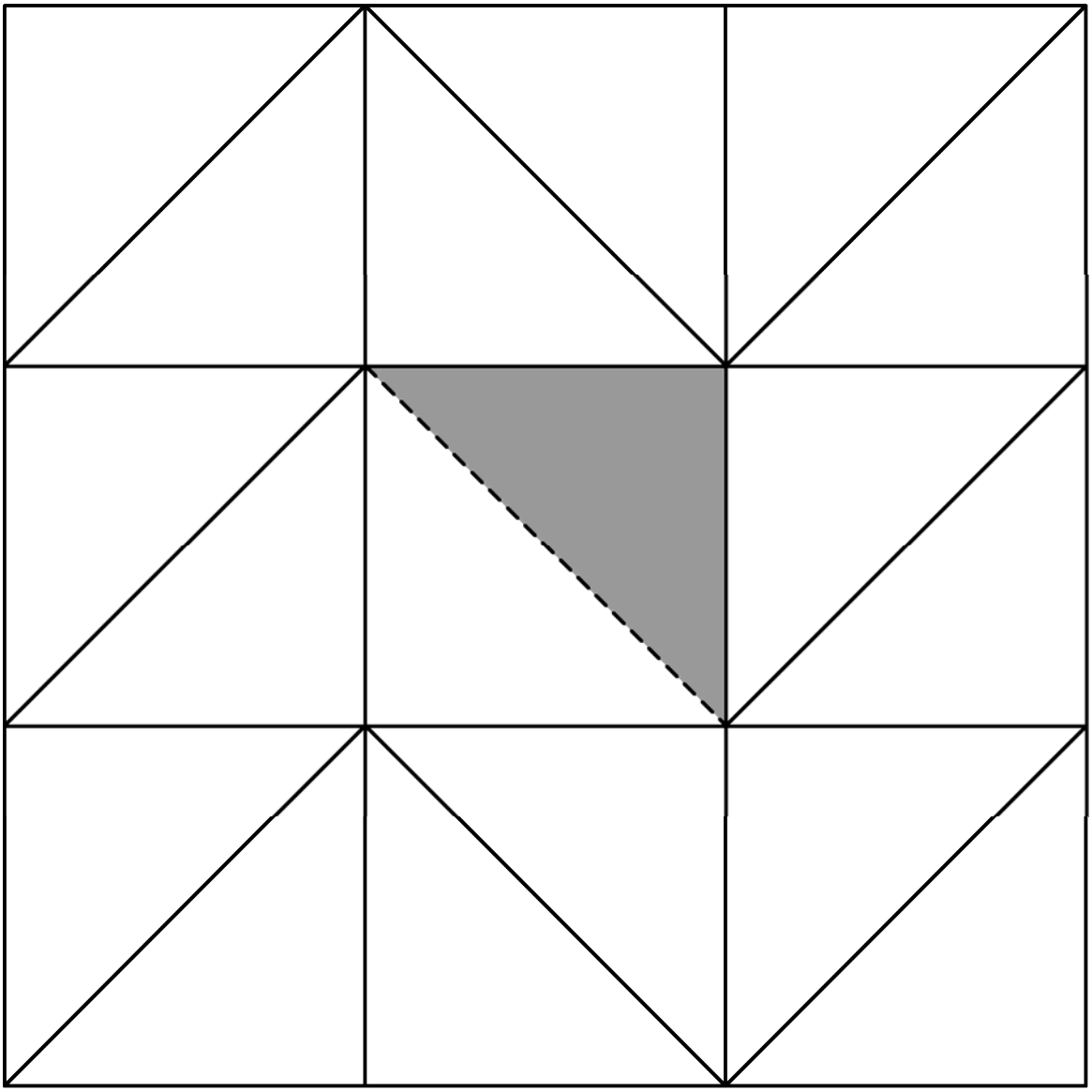
Design B



Design C



Design D



Learning and Teaching Considerations

Task 1:

A) Be sure that students understand that measurement is a number that indicates a comparison between the attribute of the object (or situation or event) being measured and the same attribute of a given unit of measure. Lengths are compared to units of length in this Challenge.

B) Be sure that students understand that to measure means that the attribute being measured is filled or covered or matched with a unit of measure with the same attribute. In this Challenge the attribute is length.

C) 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."

D) 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.

E) Be sure that students have opportunities to become familiar with the unit of measure for the task in a hands-on way. Meaningful measurement and estimation of measurements depend on a personal familiarity with the unit of measure being used.

F) Be sure that students understand that inches and centimeters are standard units. Teachers can encourage students to explore different rulers and discuss why inches and centimeters are the same everywhere. Students may explain that the length of an inch and the length of a centimeter were the same on every ruler they explored . Students may explain that people have agreed how long an inch and a centimeter are.

G) Students may explain that a centimeter is shorter in length than an inch. Therefore, a given length would be more centimeters long than inches long.

Task 2:

A) Be sure that students become familiar with the use of approximate language for estimating, such as about, a little less than, and a little more than. The use of approximate language is very useful because many measurements do not result in whole numbers.

B) Be sure that students begin to develop the idea that all measurements include some error but smaller units produce a greater degree of precision, or less error. For example, centimeters are more precise than inches.

Task 3:

A) To help increase familiarity with units, prevent errors, and to aid in the meaningful use of measurement, be sure that students become familiar with the development of benchmarks for frequently used units of measure.

B) Students should be encouraged to perform the task both procedurally and with conceptual understanding. They should be given opportunities to discuss the concept of measuring as a process of comparing attributes as well as opportunities to use measuring units and measuring instruments.

Task 4:

A) Students may have the misconception that, when measuring, it isn't necessary to line up the end of the ruler with the end of the object being measured.

Task 5:

A) Students may have the misconception that they count the first line at the end of the inch ruler in the total number of inches (which would give an answer of one extra inch). They may not realize that each inch is the distance from one point to another point.

Task 6:

A) Students may double the measurement of one diagonal by adding the measurement to itself or multiplying it by 2.

Name: ANSWER KEY Date: _____

The students in Ms. Arroyo's art class are creating designs to use as patterns for a quilt. The designs are made of squares and diagonals.

1. **Look at Design A.**

   a. **Use your ruler to measure the following to the <u>nearest inch</u>.**

The length of one side of the <u>big</u> square is

6 **inches.**

The length of one side of the <u>shaded</u> square is

3 **inches.**

NOTE: DESIGNS SHOULD BE PRINTED WITHOUT SCALING TO OBTAIN THESE MEASUREMENTS. IF THE SCALING IS OFF, ADJUST ALL ANSWERS ACCORDINGLY.

b. If you measure one side of the shaded square in centimeters, will the answer be a number that is greater than, less than, or equal to the number you got when you measured in inches?

Check one:

- [x] Greater than
- [ ] Less than
- [ ] Equal to

How do you know?

1 CENTIMETER IS SHORTER THAN 1 INCH. SO IT WILL TAKE MORE COVER THE LENGTH OF ONE SIDE.

NOTE: STUDENT IS NOT EXPECTED TO ACTUALLY MEASURE IN CENTIMETERS.

2. Look at Design B. Without measuring, do you think the dashed diagonal line is longer, shorter, or equal to the length of one side of the square?

Check one:

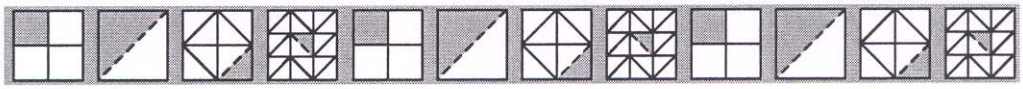
- [X] Longer* SEE NOTE
- [ ] Shorter
- [ ] Equal

*NOTE: THIS ASKS WHAT THE STUDENT IS THINKING, SO ANY BOX COULD BE CHECKED.

How do you know?

START AT ONE END OF THE DIAGONAL. IT TAKES 2 SIDES OF THE SQUARE TO REACH THE OTHER END OF THE DIAGONAL. SO 1 SIDE MUST BE LESS THAN THE DIAGONAL.

NOTE: THIS IS A HIGH-LEVEL RESPONSE THAT USES DISTANCE BETWEEN 2 POINTS. ANOTHER APPROACH WOULD BE TO IMAGINE THE DIAGONAL ROTATED HORIZONTALLY TO LINE UP WITH THE BASE OF THE SQUARE TO COMPARE LENGTHS. (OR VERTICALLY TO LINE UP WITH A SIDE.)



3. Use your ruler to measure one side of the square in Design B. How many inches long is one side?

6 _____ inches

Now use your ruler to measure the dashed diagonal in Design B to the nearest inch.

About how many inches long is the diagonal?

8 (OR 9?) _____ inches

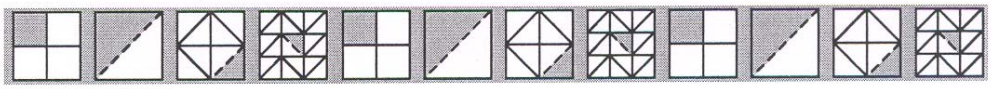
Is your actual measurement of the diagonal a little greater, a little less, or exactly this number?

THE DIAGONAL IS JUST UNDER 8½ INCHES, SO ROUNDING TO 9 IS NOT THAT BAD.

Check one:

- [X] A little greater
- [ ] A little less
- [ ] Exactly

IF STUDENT ANSWERS 9



4. Look at Design C. Use your ruler to measure one side of a small square in Design C. How many inches long is one side?

3 _____ inches

Now use your ruler to measure the dashed diagonal in Design C to the nearest inch.

About how many inches long is the diagonal?

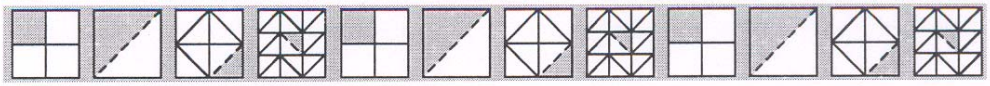
4 _____ inches

Is your actual measurement of the diagonal a little greater, a little less, or exactly this number?

(ABOUT $4\frac{1}{4}$)

Check one:

- [X] A little greater
- [ ] A little less
- [ ] Exactly



5. Now look at Design D. Use your ruler to measure one side of one of the smallest squares in design D. How many inches long is one side?

2 _____ inches

Now use your ruler to measure the dashed diagonal in Design D to the nearest inch.

About how many inches long is the diagonal?

3 _____ inches

Is your actual measurement of the diagonal a little greater, a little less, or exactly this number?

Check one:

- ☐ A little greater
- ☒ A little less (ABOUT $2\frac{13}{16}$")
- ☐ Exactly

6. **In Design D, if you put 2 diagonals together to make a line, how long do you think that line would be?**

NOTE: 5 & $5\frac{1}{2}$ ARE ALSO GOOD ESTIMATES.

A LITTLE LESS THAN 6 inches

Why do you think that?

$3 + 3 = 6$

THE ACTUAL LENGTH IS A LITTLE LESS THAN 3. SO

A LITTLE LESS THAN 3 +
A LITTLE LESS THAN 3 =
A LITTLE LESS THAN 6.

ANSWERS CAN VARY. STUDENT MAY USE 2, INSTEAD OF 3.

$2\frac{1}{2} + 2\frac{1}{2} = 5$

OR MORE THAN $2\frac{1}{2}$ +
MORE ~~THAN~~ $2\frac{1}{2}$ =
A LITTLE MORE THAN 5
FOR EXAMPLE.

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement
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 answers 6 and 3 in part (a). Students answers greater than in part (b) and explains that 1 centimeter is a shorter unit of measure than 1 inch. **Task 2**. Student identifies the diagonal as longer without measuring it. Student also explains why it is longer without simply saying "It looks longer." **Task 3**. Student answers 6 and 8 or 9, as shown on the answer sheet. (Note: An estimate of $8\frac{1}{2}$ is not to the nearest inch.) Student checks appropriate box. **Task 4**. Student answers 3 and 4, as shown on the answer sheet. (Note: An estimate of $4\frac{1}{4}$ is not to the nearest inch.) Student checks appropriate box. **Task 5**. Student answers 2 and 3, as shown on the answer sheet. (Note: An estimate of $2\frac{7}{8}$ is not to the nearest inch.) Student checks appropriate box. **Task 6**. Student estimates any length between 5 and 6 inches and provides an appropriate explanation.	Response shows evidence in only 4 of the tasks described in category 4. Student may use fractional estimates for the diagonals in tasks 3, 4, and 5. Although the fractional answer may be a correct measurement, it is not given to the nearest whole inch, as indicated in the directions.	Response shows evidence in only 3 of the tasks described in category 4.	Response shows evidence in only 2 or fewer of the tasks described in category 4.

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement
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 1**. Teacher should indicate on response sheet if student is using ruler correctly. Student may show pencil markings on the picture of design A. **Task 2**. Student may show pencil markings on picture of design B. **Task 3**. Teacher should indicate on response sheet if student is using ruler correctly. **Task 4**. Teacher should indicate on response sheet if student is using ruler correctly. **Task 5**. Teacher should indicate on response sheet if student is using ruler correctly. **Task 6**. Student may show evidence of adding fractions or of drawing and measuring a line of two diagonals.	Response shows evidence in only 4 or 5 of the tasks described in category 4.	Response shows evidence in only 2 or 3 of the tasks described in category 4.	Response shows evidence in 1 or none of the tasks described in category 4.

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement
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 1**. Student explains that the unit centimeter is smaller than the unit inch and therefore it will take more centimeters than inches to cover the length of one side. **Task 2**. Student is able to give an explanation on why the diagonal is longer than one side of the square beyond saying that it looks longer. A good explanation will include distance from a starting point to an ending point. **Task 6**. Student explains how he or she obtained the estimate. The explanation can use the estimate from task 5 or may use addition of fractions.	Response shows evidence in only 2 explanations described in category 4.	Response shows evidence in only 1 explanation described in category 4.	Response shows no evidence of the explanations described in category 4.

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement
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 answers 6, 3, and checks the appropriate box, as shown on the answer sheet. **Task 3**. Student answers 6, 8 (or 9), and checks the appropriate box, as shown on the answer sheet. **Task 4**. Student answers 3, 4, and checks appropriate box, as shown on the answer sheet. **Task 5**. Student answer 2, 3, and checks appropriate box, as shown on the answer sheet. **Task 6**. Student provides an answer between 5 and 6, inclusive.	Student provides correct answers for only 4 of the tasks described in category 4.	Student provides correct answers for only 3 of the tasks described in category 4.	Student provides correct answers for 2 or fewer of the tasks described in category 4.

Scoring notes checklist

Task	Check Yes	Category
Task 1		
Student answers 6 and 3 in part (a). Students answers greater than in part (b) and explains that 1 centimeter is a shorter unit of measure than 1 inch.		Concept
Teacher should indicate on response sheet if student is using ruler correctly. Student may show pencil markings on the picture of design A.		Strategy
Student explains that the unit centimeter is smaller than the unit inch and therefore it will take more centimeters than inches to cover the length of one side.		Explanation
Student answers 6, 3, and checks the appropriate box, as shown on the answer sheet.		Accuracy
Task 2		
Student identifies the diagonal as longer without measuring it. Student also explains why it is longer without simply saying "It looks longer."		Concept
Student may show pencil markings on picture of design B.		Strategy
Student is able to give an explanation on why the diagonal is longer than one side of the square beyond saying that it looks longer. A good explanation will include distance from a starting point to an ending point.		Explanation
Task 3		
Student answers 6 and 8 or 9, as shown on the answer sheet. (Note: An estimate of $8\frac{1}{2}$ is <u>not</u> to the nearest inch.) Student checks appropriate box.		Concept
Teacher should indicate on response sheet if student is using ruler correctly.		Strategy
Student answers 6, 8 (or 9), and checks the appropriate box, as shown on the answer sheet.		Accuracy
Task 4		
Student answers 3 and 4, as shown on the answer sheet. (Note: An estimate of $4\frac{1}{4}$ is <u>not</u> to the nearest inch.) Student checks appropriate box.		Concept
Teacher should indicate on response sheet if student is using ruler correctly.		Strategy
Student answers 3, 4, and checks the appropriate box, as shown on the answer sheet.		Accuracy

Task 5		
Student answers 2 and 3, as shown on the answer sheet. (Note: An estimate of $2\frac{7}{8}$ is <u>not</u> to the nearest inch.) Student checks appropriate box.		Concept
Teacher should indicate on response sheet if student is using ruler correctly.		Strategy
Student answer 2, 3, and checks the appropriate box, as shown on the answer sheet.		Accuracy
Task 6		
Student estimates any length between 5 and 6 inches and provides an appropriate explanation.		Concept
Student may show evidence of adding fractions or of drawing and measuring a line of two diagonals.		Strategy
Student explains how he or she obtained the estimate. The explanation can use the estimate from task 5 or may use addition of fractions.		Explanation
Student provides an answer between 5 and 6, inclusive.		Accuracy

SITES-M Mathematics Challenge

Grade 2–Focus on Measurement

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.