Name: Emily Staskin and Jewel A. **Date:** 10/11/19 **Grade/Class:** ELL Math Concepts

SOL: A.3 The student will simplify a) square roots of whole numbers and monomial algebraic expressions.

Learning Target:

- I can identify prime and composite numbers.
- I can determine the factor pairs of numbers.

Language Target:

- Students will identify prime numbers, composite numbers, and factor pairs.
- Students will use square tiles to model prime numbers, composite numbers, and factor pairs.

Key Vocabulary: prime numbers, composite numbers, factor pairs

Materials: Square tiles, Prime and Composite Worksheet (attached at the end of the lesson plan)

SIOP Features

Preparation: X Adaptation of content ☐ Links to background X Links to past learning X Strategies incorporated	Scaffolding: X Modeling X Guided Practice X Independent Practice X Comprehensible Input	Group Options: X Whole class X Small groups X Partners X Independent
Integration of Process: X Reading X Writing X Speaking X Listening	Application: X Hands-on X Meaningful X Linked to objectives X Promotes engagement	Assessment: X Individual X Group X Written X Oral

Model Performance Indicators

Domain to Be Assessed:			
WIDA Level	**Task/Verb**	**Content**	**Instructional Support**
1	Model numbers as rectangles	to identify prime numbers, composite numbers, and perfect squares	using square tiles and graphic organizers in partners, following modeling by the teacher.
2	Model numbers as rectangles	to identify prime numbers, composite numbers, and perfect squares	using square tiles and graphic organizers in partners.
3	Model numbers as rectangles	to identify prime numbers, composite numbers, and perfect squares	using square tiles in partners.
4	Model numbers as rectangles	to identify prime numbers, composite numbers, and perfect squares	using square tiles.

MPI Level 1: Model numbers as rectangles to identify prime numbers, composite numbers, and perfect squares using square tiles and graphic organizers in partners, following modeling by the teacher.
MPI Level 2: Model numbers as rectangles to identify prime numbers, composite numbers, and perfect squares using square tiles and graphic organizers in partners.
MPI Level 3: Model numbers as rectangles to identify prime numbers, composite numbers, and perfect squares using square tiles in partners.
MPI Level 4: Model numbers as rectangles to identify prime numbers, composite numbers, and perfect squares using square tiles.

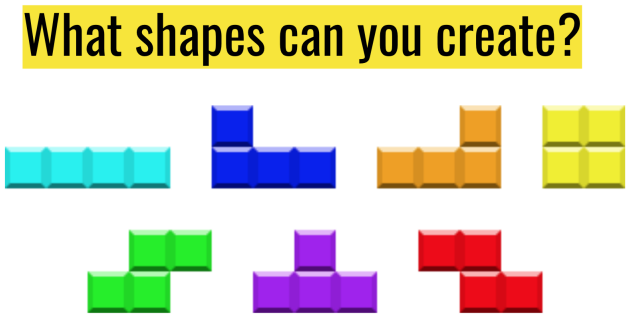
Lesson Sequence:

Engagement (3 min):

Students are given square tiles and are asked to explore them create their own design. The teachers give the students a lot of freedom during this stage with the manipulatives. They will

monitor the class and and partners about the shapes and numbers they are modeling. The goal is for the teachers to find out what information the students know about factor pairs and representations of numbers in area models.

The following slide will be on the board for students to reference as the teachers monitor the class:

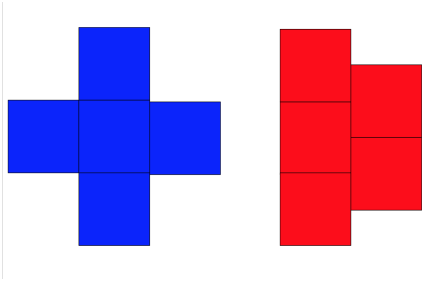


Key Questions:

- *What number is that? What shape is it?*
- *What kind of shapes can you make with the blocks?*
- *How can the blocks represent numbers? What would one green block represent?*

Exploration (7 min):

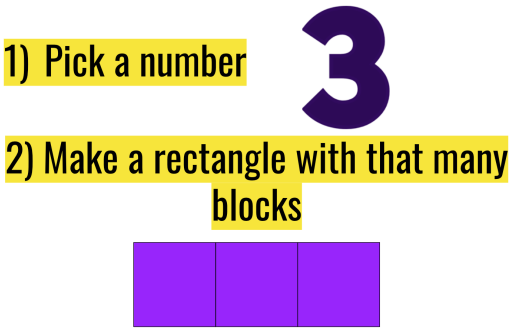
Teachers start by having students make the number 5 with the square tiles in any way they choose. After everyone has time to model 5 in their own way, the teacher will ask for student volunteers to show the class the model they made. Some possible examples are below:



Students will be given the Prime and Composite Worksheet to record their explorations and notes for the rest of the lesson. The prompts in the worksheet correspond to the prompts the teacher will give the class for each task.

Then, the teacher will prompt them to model the number 5 in a rectangle (there is only one way to do this, shown below).

Then, the students would be asked to choose their own number and make a rectangle to represent it. The teacher will display the following example on the board for students who do not understand all of the vocabulary in the directions:



Students will share their numbers with their partner. If they finish earlier than other groups, the teacher will prompt them to model another number and compare the two models. After all the students have a chance to work on their own, the teacher will ask students to volunteer one of their models. This can be done by verbally explaining their model, drawing it on the board, or showing the class their physical model.

Then, the teacher will have students work in pairs to model the numbers 5, 7, 8, and 12 in as many different rectangles as they can.

5	7	8	12
▢▢▢▢▢	▢▢▢▢▢▢▢	▢▢▢▢▢▢▢▢ ▢▢▢▢ ▢▢▢▢	▢▢▢▢▢▢▢▢▢▢▢▢ ▢▢▢▢ ▢▢▢▢ ▢▢▢▢ ▢▢▢▢▢▢ ▢▢▢▢▢▢

Once the students make the rectangles with the square tiles, they will draw them and label the sides (i.e. labeling the dimensions of the rectangle).

Key Questions:

- *What do you notice about the rectangles?*
- *Why can you make more than one rectangle for some numbers and not others?*

Explanation (10 min):

Once the students have worked through modeling each of the given numbers, the teacher will fill out the worksheet on the board using the student's work. The students can share their ideas by drawing their models on the board, showing the teacher their physical model, or explaining to the teacher how they made their model.

The teacher will take the student observations and help the students sort given numbers into two groups: numbers modeled by one rectangle and numbers modeled by more than one rectangle. As they sort, the teacher will help students identify the dimensions of the rectangles if they have not already done so.

The goal is for students to realize that the dimensions of the rectangles are the *factors* of the number the rectangle creates. They may notice that 2*4=8, but not know what to call that. The teacher will give them the language (*factors or factor pairs*). Once the students are finished the sort, the teacher will rename the two categories 'Prime Numbers' and 'Composite Numbers' and give the formal definitions of the vocabulary words.

- Factor Pair: Two numbers multiplied together to produce another number.
- Prime Number: A number having only factors are 1 and itself.
- Composite Numbers: A number having more factors than 1 and itself.

Key Questions:

- *What do you notice about the sides of the rectangle? How do they relate to the number the rectangle represents?*
- *Why did you place that number in that particular category? How do you know it goes there?*
- *Can you explain to me in your own words what a prime or composite number is?*

Elaboration/Extension/Expansion (5 min):

The teacher will then prompt students to test new numbers and determine whether they are prime or composite. Students will write their numbers in the table at the bottom of their worksheet.

Key Questions:

- *What do you notice is different about the rectangles for 4 and 9?*
- *What are the factor pairs for the rectangles of 4 and 9?*
- *What characteristics do the factors of perfect squares have?*

Evaluation (5 min):

All students will give an example of at least one prime number and at least one composite number in their worksheet, which will be collected by the teachers. How they give this example will depend on their WIDA level.

Level 1: Students will work in pairs to make a rectangle to represent one prime and one composite number.

Level 2: Students will individually make a rectangle to represent one prime and one composite number.

Level 3: Students will draw and label a rectangle to represent one prime and one composite number.

Level 4: Students will identify one prime, one composite, and one perfect square number. They do not have to use the Algeblocks, but are welcome to use them to come up with their numbers.

Prime and Composite

Example: Draw a rectangle with 5 blocks and label the sides

5

1 □□□□□

1) **Draw a rectangle with 7 blocks and label the sides**

2) **Draw rectangles with 8 blocks and label the sides**

3) **Draw rectangles with 12 blocks and label the sides**

_____	_____
Numbers modeled by one rectangle:	Numbers modeled by more than one rectangle:

_____: Two numbers multiplied together to produce another number.

_____: A number having only factors are 1 and itself.

_____: A number having more factors than 1 and itself.

Use your blocks to find prime and composite numbers.

Prime	**Composite**