Unit 1, Lesson 2

Finding Area by Decomposing and Rearranging

Goals

- Calculate the area of a region by decomposing it and rearranging the pieces, and explain (orally and in writing) the solution method.
- Recognize and explain (orally) that if two figures can be placed one on top of the other so that they match up exactly, they must have the same area.
- Show that area is additive by composing polygons with a given area.

Learning Targets

- I can explain how to find the area of a figure that is composed of other shapes.
- I know how to find the area of a figure by decomposing it and rearranging the parts.
- I know what it means for two figures to have the same area.

Lesson Narrative

In this lesson, students learn to reason flexibly about two-dimensional figures to find their **areas**.

Students begin by revisiting the definitions for "area" that they learned in earlier grades. They refine these definitions and arrive at a definition that can be used by the class for the rest of the unit. Along the way, students practice attending to precision (MP6).

Next, students use tangram pieces to explore ways of reasoning about area. They *compose* and rearrange a square and some triangles to form figures of certain areas. Students see that the area of a two-dimensional figure can be determined in multiple ways:

- by composing that figure using smaller pieces with known areas
- by *decomposing* the figure into shapes whose areas we can determine and adding the areas of those shapes
- by decomposing it and rearranging the pieces into a different but familiar shape whose area can be found

In an optional activity, students use these strategies to reason about the area of individual tangram pieces and practice constructing logical arguments to justify their reasoning (MP3).

By the end of the lesson, two key principles about area are made explicit: Figures that match exactly have equal areas, and area is additive (in that the area of a figure is the sum of the areas of all non-overlapping pieces that compose it).

Math Community

In this lesson, students review the themes that arose when they shared their initial thoughts in Exercise 1 about what they think it should look like and sound like to do math together as a community. Students then have a chance to both affirm and add to the ideas that were generated.

Standards

Building On	**3.MD.C.5.b**
Addressing	**6.G.A.1**
Building Toward	**6.G.A**

Instructional Routines

- MLR2: Collect and Display
- Notice and Wonder

Required Materials

Materials to Gather

- Geometry toolkits: Lesson, Activity 4
- Pre-assembled or commercially produced tangrams: Lesson, Activity 3, Activity 4
- Math Community Chart: Activity 1, Cool-down
- Sticky notes: Activity 1

Materials to Copy

- Composing Shapes Cutouts (1 copy for every 2 students): Activity 3

Required Preparation

Activity 3:

For every group of 2 students, prepare 1 set of tangrams that contains 1 square, 4 small triangles, 1 medium triangle, and 2 large triangles. Print and cut out the blackline master (printing on card stock is recommended), or use commercially-available tangrams.

Note that the tangram pieces used here differ from a standard set in that two additional small triangles are used instead of a parallelogram.

For the digital version of the activity, acquire devices that can run the applet.

Activity 4:

For the digital version of the activity, acquire devices that can run the applet.

Lesson:

Make sure that students have access to their geometry toolkits, which should include tracing paper, graph paper, colored pencils, scissors, and an index card to use as a straightedge or to mark right angles.

Student Facing Learning Goals

Let's create shapes and find their areas.

2.1 Notice and Wonder: Squares in Shapes

5 min

Warm-up

Activity Narrative

This is the first Notice and Wonder activity in this course. Students are shown four drawings and asked: "What do you notice? What do you wonder?"

Students are given time to write down what they notice and wonder about the images and then time to share their thoughts. Their responses are recorded for all to see. Often, the goal is to elicit observations and curiosities about a mathematical idea that students are about to explore. Pondering the two open questions allows students to build interest about and gain entry into an upcoming task.

The purpose of this *Warm-up* is to elicit observations about squares that tile a region, which will be useful when students think about the meaning of "area" later in the lesson. While students may notice and wonder many things about these images, the important discussion points are observations about equal-size squares covering a region completely without gaps or overlaps.

When students articulate what they notice and wonder, they have an opportunity to attend to precision in the language that they use to describe what they see (MP6). They might first propose less formal or imprecise language, and then restate their observation with more precise language in order to communicate more clearly.

Standards

Building On **3.MD.C.5.b**

Building Toward **6.G.A**

Instructional Routines

- Notice and Wonder

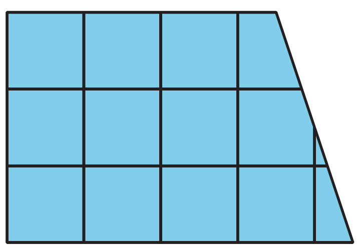
Launch

Arrange students in groups of 2. Display the four images for all to see. Ask students to think of at least one thing they notice and at least one thing they wonder. Give students 1 minute of quiet think time, and then 1 minute to discuss with their partner the things they notice and wonder.

Student Task Statement

What do you notice? What do you wonder?

A



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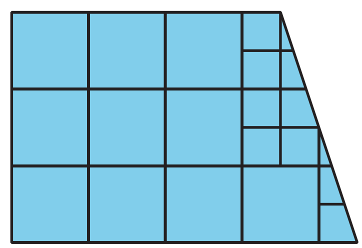

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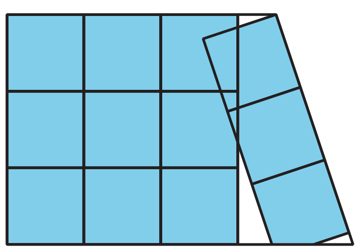

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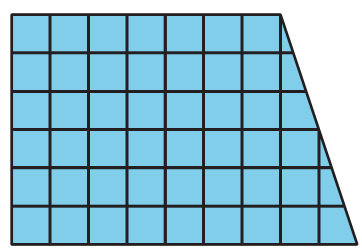


Student Response

Students may notice:

- A, B, C, and D are all the same shape.

- All four drawings are filled with squares or parts of squares on the inside.
- A, C, and D are filled with squares that are the same size. The squares in B are of two different sizes.
- In C, there are some gaps between the squares, and some squares overlap.
- There are many more squares in D compared to the other figures.

Students may wonder:

- Why are three squares in C rotated to follow the direction of the slanted side?
- Why is B filled with different-size squares?
- What is the size of each large square and each small square?
- Can the partial squares in A, B, and D be put together to make whole squares?

Activity Synthesis

Ask students to share the things they noticed and wondered. Record and display their responses for all to see, without editing or commentary. If possible, record the relevant reasoning on or near the images. Next, ask students, “Is there anything on this list that you are wondering about now?” Encourage students to respectfully disagree, ask for clarification, or point out contradicting information.

If the gaps and overlaps in C don’t come up during the conversation, ask students to discuss this idea.

Math Community
Display the class Math Community Chart for all to see and explain that the listed “doing math” actions come from the sticky notes students wrote in the first exercise. Give students 1 minute to review the chart. Then invite students to identify something on the chart they agree with and hope for the class or something they feel is missing from the chart and would like to add. Record any additions on the chart. Tell students that the chart will continue to grow and that they can suggest other additions that they think of throughout today’s lesson during the Cool-down.

2.2 What Is Area?

10 min

Activity Narrative

In this activity, students recall and refine their prior knowledge of area. They articulate a definition of “area” that can be used for the rest of the unit. This definition of “area” is not new but rather reiterates what students learned in grades 3–5.

In the *Warm-up*, students analyzed four ways that a region was tiled or otherwise fitted with squares. Here, students revisit the same images and decide which arrangements of squares can be used to find the area of the region and why. Students use their analysis to write a definition of “area.” In identifying the most important aspects that should be included in the definition, students attend to precision (MP6).

Students' initial definitions may be incomplete. During partner discussions, monitor for students who mention the following aspects so they can share later:

- Plane or two-dimensional region
- Square units

- Covering a region completely without gaps or overlaps

Standards

Building On **3.MD.C.5.b**

Building Toward **6.G.A**

Launch

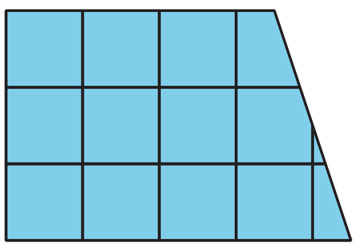
Arrange students in groups of 2. Give students 1 minute of quiet think time for the first question and ask them to be ready to explain their decision. Then give partners 3–4 minutes to share their responses and to complete the second question together.

Student Task Statement

You may recall that the term **area** tells us something about the number of squares inside a two-dimensional shape.

1. Here are four drawings that each show squares inside a shape. Select **all** drawings whose squares could be used to find the area of the shape. Be prepared to explain your reasoning.

A



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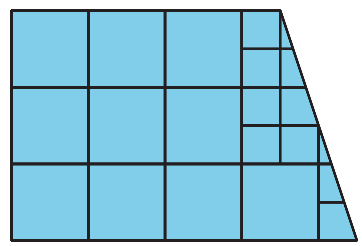

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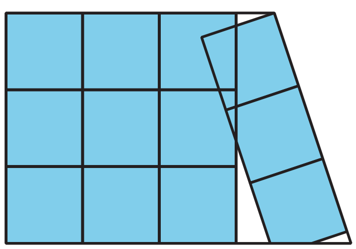

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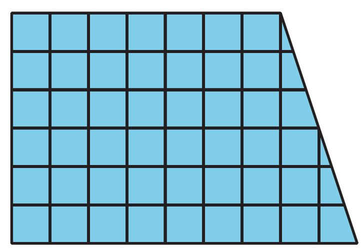


2. Write a definition of “area” that includes all the information that you think is important.

Student Response

1. Shapes A and D. Shape B could be considered if the larger squares and the smaller ones are distinguished when determining area.
2. Answers vary, but the working definition should contain all of these components: “The area of a two-dimensional region (in square units) is the number of unit squares that cover the region without gaps or overlaps.”

Building on Student Thinking

Students may focus on how they have typically found the area of a rectangle—by multiplying its side lengths—instead of thinking about what “the area of any region” means. Ask them to consider what the product of the side lengths of a rectangle actually tells us. (For example, if they say that the area of a 5-by-3 rectangle is 15, ask what the 15 means.)

Some students may think that none of the options, including Options A and D, could be used to find the area of the region because they involve partial squares, or because the partial squares do not appear to be familiar fractional parts. Use of benchmark fractions may help students see that the area of a region could be a non-whole number. For example, ask students if the area of a rectangle could be $8\frac{1}{2}$ or $2\frac{1}{4}$ square units.

Activity Synthesis

The purpose of this discussion is to elicit key points to include in a class definition of "area." Invite students to share their responses to the first question and to explain their reasoning. Ask questions such as:

- “What is it about Shapes A and D that can help us find the area?” (The squares are all the same size. They are unit squares.)
- “What is it about Shape C that might make it unhelpful for finding the area?” (The squares overlap and do not cover the entire region, so counting the squares won't give us the area.)
- “If you think Shape B *cannot* be used to find the area, why not?” (We can't just count the number of squares and say that this number is the area because the squares are not all the same size.)
- “If you think we *can* use Shape B to find the area, how?” (Four small squares make a large square. If we count the number of large squares and the number of small squares separately, we can convert one to the other and find the area in terms of either one of them.)

If time permits, discuss:

- “How are Shapes A and D different?” (Shape A uses larger unit squares and Shape D uses smaller ones. Each size represents a different unit.)
- “Will Shapes A and D give us different areas?” (They will give us the same area, but in different units—for example, square inches and square centimeters.)

Select 2–3 groups previously identified to share their definitions of “area” or what they think should be included in the class definition of “area.” The discussion should lead to a class definition that conveys key aspects of area: The area of a two-dimensional region (in square units) is the number of unit squares that cover the region without gaps or overlaps.

Display the class definition and revisit as needed throughout this unit. Tell students that this will be a working definition that can be revised as they continue their work in the unit.

2.3 Composing Shapes

20 min

Activity Narrative

There is a digital version of this activity.

In this activity, students further develop their understanding that area is additive. Students compose tangram pieces—consisting of triangles and a square—into shapes with certain areas. The square serves as a unit square. Because students have only one square, they need to use these principles in their reasoning:

- If two figures can be placed one on top of the other so that they match up exactly, then they have the same area.
- If a figure is decomposed and rearranged to compose another figure, then the area of the new figure is the same as the area of the original figure.

Each question in the activity aims to elicit discussions about those two principles. Though they may seem obvious, these principles still need to be stated explicitly (at the end of the lesson) because a more-advanced understanding of the area of complex figures depends on them. As students work, look for those whose reasoning illustrates the principles.

This is the first time Math Language Routine 2: *Collect and Display* is suggested in this course. In this routine, the teacher circulates and listens to student talk while jotting down words, phrases, drawings, or writing that students use. The language collected is displayed visually for the whole class to use throughout the lesson and unit. The purpose of this routine is to capture a variety of students' words and phrases—especially including everyday or social language and non-English—in a display that students can refer to, build on, or make connections with during future discussions, and to increase students' awareness of language used in mathematics conversations.

In the digital version of the activity, students use an applet showing 8 tangram pieces to determine the relationships between the areas. Consider using the applet if physical tangram pieces are not available. The applet is adapted from the work of Harry Drew in GeoGebra.

Access for English Language Learners

This activity uses the *Collect and Display* math language routine to advance conversing and reading as students clarify, build on, or make connections to mathematical language.

Standards

Addressing **6.G.A.1**

Instructional Routines

- MLR2: Collect and Display

Launch

Keep students in groups of 2. Give each group the following set of tangram pieces from the blackline master or from commercially available sets. Note that the tangram pieces used here differ from a standard set in that two additional small triangles are used instead of a parallelogram.

- 1 square
- 4 small triangles
- 1 medium triangle
- 2 large triangles

It is important not to give them more than these pieces.

Give students 2–3 minutes of quiet think time to consider the first three questions. Ask them to pause afterward and compare their solutions to their partner's. If partners created the same shape for each question, ask them to create a different shape that has the same given area before moving on. Then ask them to work together to answer the remaining questions.

Use *Collect and Display* to create a shared reference that captures students' developing mathematical language. Collect the language that students use to describe their work with the tangram pieces. Display words and phrases, such as "make," "build," "put together," "join," "compose," "break" or "break apart," "decompose," "match up," "move around," and "rearrange."

Access for Students with Disabilities

Action and Expression: Internalize Executive Functions. To support working memory, provide students with access to sticky notes or mini whiteboards. They can trace the square composed of 2 medium triangles and use it as a reference for 1 square unit.

Supports accessibility for: Memory, Organization

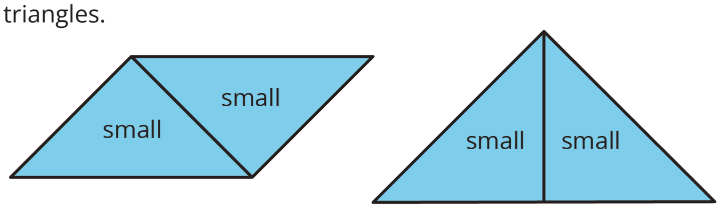
Student Task Statement

Your teacher will give you 1 square and some small, medium, and large right triangles. The area of the square is 1 square unit.

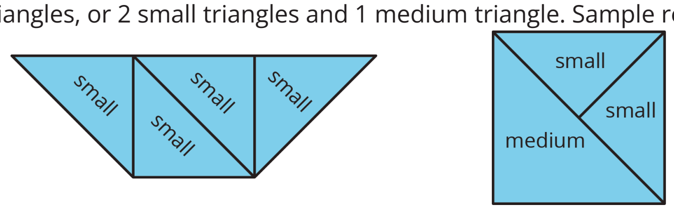
1. Notice that you can put together 2 small triangles to make a square. What is the area of the square composed of 2 small triangles? Be prepared to explain your reasoning.
2. Use your shapes to create a new shape with an area of 1 square unit that is *not* a square. Trace your shape.
3. Use your shapes to create a new shape with an area of 2 square units. Trace your shape.
4. Use your shapes to create a *different* shape with an area of 2 square units. Trace your shape.
5. Use your shapes to create a new shape with an area of 4 square units. Trace your shape.

Student Response

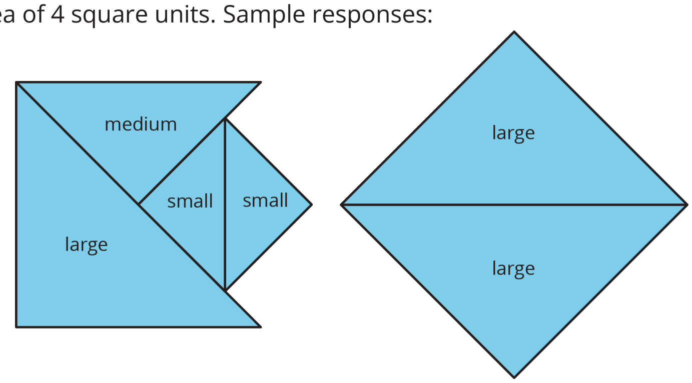
1. The area of the square made from 2 small triangles is 1 square unit because it is identical to the given square with an area of 1 square unit. “Identical” means you can put one on top of the other and they match up exactly.
2. Any composite of 2 small triangles.



3. Any composite of 4 small triangles, or 2 small triangles and 1 medium triangle. Sample responses:



4. Any composite of 4 small triangles, or 2 small triangles and 1 medium triangle.
5. Any composite with an area of 4 square units. Sample responses:



Building on Student Thinking

Students may consider the area to be the number of pieces in a composition, instead of the number of square units.

This confusion may be more likely to arise when the number of pieces is the same as the number of square units, as in the *Are You Ready for More?* Remind students of the meaning of “area,” or prompt them to review the definition of “area” discussed in an earlier activity.

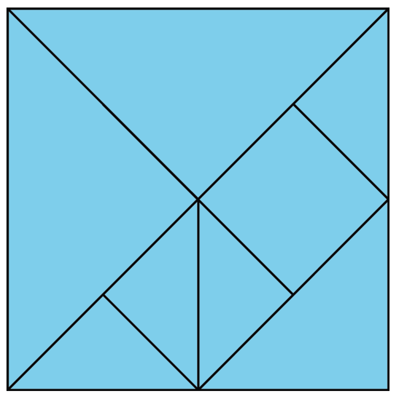
Because the two large triangles in the tangram set can be arranged to form a square, students may consider that square to be the square unit rather than the smaller square composed of two small triangles. Ask students to review the task statement and verify the size of the unit square**.**

Are You Ready for More?

Find a way to use all of your pieces to compose a single large square. What is the area of this large square?

Extension Student Response

The area is 8 square units. Sample response:



Activity Synthesis

The purpose of the discussion is to make two principles explicit: Two regions have the same area if they match up exactly when superimposed, and the area of a region is preserved even when the region is decomposed and rearranged.

Direct students' attention to the reference created using *Collect and Display*. Ask previously identified students to share the shapes they created and to explain how they knew those shapes have certain areas. Invite students to borrow language from the display as needed. As they respond, update the reference to include additional phrases.

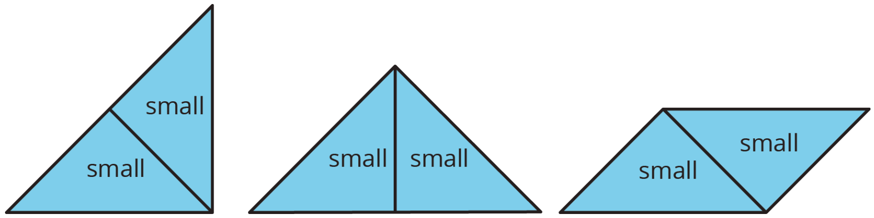
After each student shares an explanation, use the terms “compose,” “decompose,” and “rearrange” to name these moves. Clarify that to *compose* means to join or put together and *decompose* means to break apart or separate.

Highlight the following points:

- First question: Two small triangles can be composed into a square that matches up exactly with the given square piece. This means that the two squares—the composite and the unit square—have the same area.

Tell students, “If a region can be placed on top of another region so that they match up exactly, then they have the same **area**.”

- Second question: Two small triangles can be rearranged to compose a different figure, but the area of that composite is still 1 square unit. The following three shapes—each composed of 2 triangles—have the same area. If we rotate the first figure, it can be placed on top of the second so that they match up exactly. The third figure has a different shape than the other two, but because it is made up of the same 2 triangles, it has the same area.



Emphasize: "If a figure is decomposed and rearranged as a new figure, the area of the new figure is the same as the area of the original figure."

- Third and fourth questions: The composite figures could be formed in several ways—with only the four small triangles, with two small triangles and a medium triangle, or with two small triangles and a square.
- Last question: A large triangle is needed here. To find its area, either compose four smaller triangles into a large triangle, or recognize that the large triangle could be decomposed into four smaller triangles, which can then be composed into 2 unit squares.

Access for Students with Disabilities

*Representation: Develop Language and Symbol*s. Create a display of important terms and vocabulary. Invite students to suggest language or diagrams to include that will support their understanding of these terms. Include the following terms and maintain the display for reference throughout the unit: "area," "compose," "decompose," and "rearrange."
Supports accessibility for: Conceptual processing; Language

2.4 Tangram Triangles

Optional

15 min

Activity Narrative

There is a digital version of this activity.

In this activity, students reason about the area of each tangram triangle based on the areas of composite shapes that they previously created. Students may have recognized that the area of one small triangle is $\frac{1}{2}$ square unit, the area of one medium triangle is 1 square unit, and the area of one large triangle is 2 square units. Here, they articulate how they know that these conclusions are true, using written words or illustrations that are clearly labeled. They also listen to their partner's explanations. In doing so, students practice constructing logical arguments and critiquing the reasoning of others (MP3).

As partners discuss, look for two ways of thinking about the area of each assigned triangle: by composing copies of the triangle into a square or a larger triangle, or by decomposing the triangle or the unit square into smaller pieces and rearranging the pieces. Identify at least one student who uses each approach.

In the digital version of the activity, students can use the same applet as in the previous activity to support their reasoning.

Access for English Language Learners

This activity uses the *Collect and Display* math language routine to advance conversing and reading as students clarify, build on, or make connections to mathematical language.

Standards

Addressing **6.G.A.1**

Instructional Routines

- MLR2: Collect and Display

Launch

Keep students in groups of 2. Assign the first and second questions to one partner and the second and third questions to the other partner. Give each group access to the geometry toolkits and the same set of tangram pieces as used in the earlier activity, "Composing Shapes."

Give students 3–4 minutes of quiet time to find the areas of their assigned triangles and to construct their explanations, followed by a few minutes to share their responses with their partner. Tell students that as one partner explains, the other should listen carefully and either agree or disagree with the explanation. Partners should then come to an agreement about the answers and explanations.

Use *Collect and Display* to direct attention to words collected and displayed from the "Composing Shapes" activity. Invite students to borrow language from the display as needed, and update it throughout the lesson.

Student Task Statement

Recall that the area of the square you saw earlier is 1 square unit. Complete each statement and explain your reasoning.

1. The area of the small triangle is ________ square units. I know this because . . .
2. The area of the medium triangle is ________ square units. I know this because . . .
3. The area of the large triangle is ________ square units. I know this because . . .

Student Response

1. $\frac{1}{2}$ square unit. Sample reasoning:
    - Two small triangles can be put together to make a square, which has an area of 1 square unit. Because this composite shape matches the unit square exactly, their areas must be equal. This means that the area of each small triangle is half the area of the unit square.
    - A square can be decomposed into exactly two small triangles. So, the area of each small triangle must be half of the area of the square.
2. 1 square unit. Sample reasoning:
    - Two small triangles can be put together to make one medium triangle. Two small triangles can also be put together to make a square with an area of 1 square unit. Because two small triangles make either a medium triangle or a square, the area of the medium triangle must be 1 square unit.
    - One medium triangle can be decomposed into two small triangles. These can be rearranged into a square whose area is 1 square unit, so the area of the medium triangle is also 1 square unit.
3. 2 square units. Sample reasoning:
    - Two medium triangles can be arranged into one large triangle. Because the area of the medium triangle is 1 square unit, a figure that is composed of two of them has an area of 2 square units.
    - A large triangle can be decomposed into 4 small triangles, which can in turn be rearranged into two squares. The combined area of the two squares is 2 square units.

Building on Student Thinking

If students initially have trouble determining the areas of the shapes, ask how they reasoned about areas in the previous activity. Show examples of composed and decomposed shapes that form 1 square unit to which students can refer.

Activity Synthesis

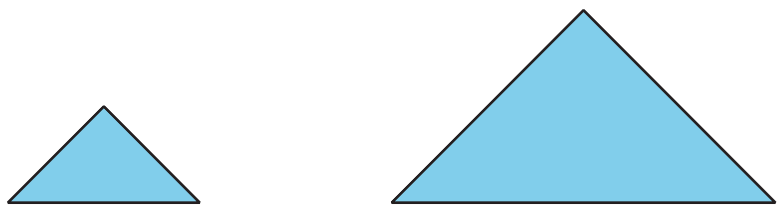
After partners share and agree on the correct areas and explanations, discuss with the class:

- "Did you and your partner use the same strategy to find the area of each triangle?"
- "How were your explanations similar? How were they different?"

Select two previously identified students to share their explanations: One who reasoned in terms of *composing* copies of the assigned triangle into another shape, and one who reasoned in terms of *decomposing* the triangle or the unit square into smaller pieces and *rearranging* them. If these strategies are not brought up by students, be sure to make them explicit at the end of the lesson.

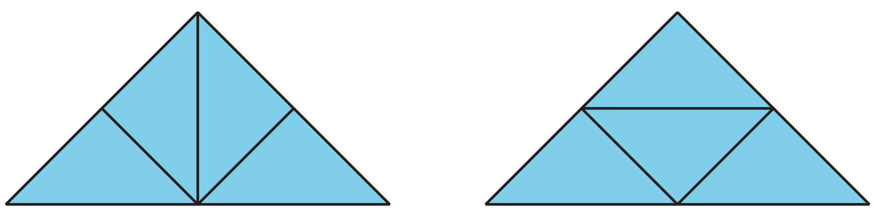
Lesson Synthesis

To highlight the key principles for reasoning about area, reiterate the strategies used in this lesson for comparing areas. Present an example: "Suppose we know the area of a small triangle. How can it help us find the area of a large triangle?"

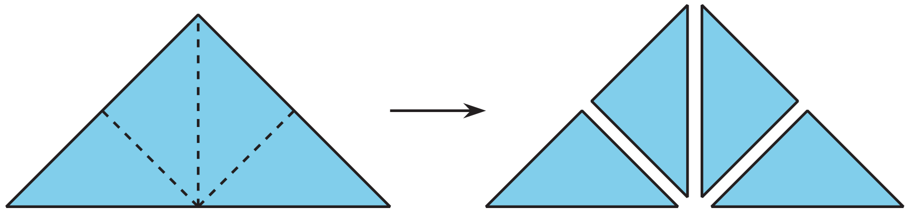


Demonstrate the following strategies (using tangram pieces, if possible):

- We can *compose* a large triangle from 4 small triangles. If we place a large triangle on top of the 4 small triangles and they match up exactly, we know that the area of the large triangle is equal to the combined area of 4 small triangles.



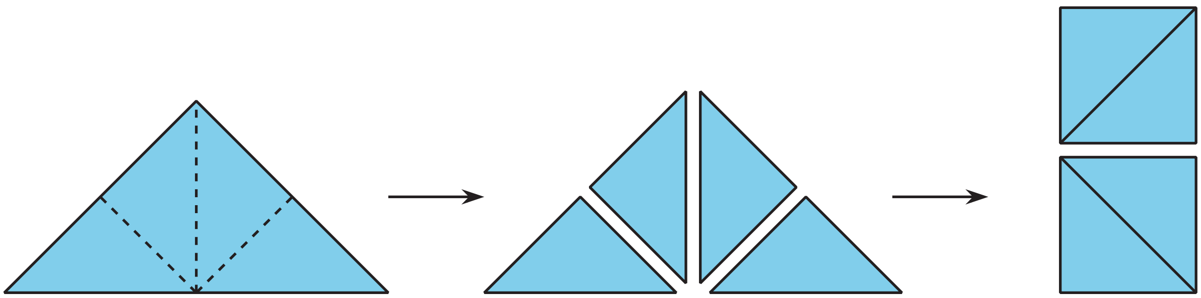
- We can *decompose* the large triangle into 4 small triangles. Again, we can reason that the area of 1 large triangle is equal to the combined area of 4 small triangles.



Give another example: “Suppose we don't know the area of a small triangle, but we do know the area of a square that is composed of 2 small triangles. How can we find the area of a large triangle?”

Demonstrate another strategy:

- We can decompose the large triangle into 4 small triangles and then *rearrange* them into 2 squares. We can reason that the area of the large triangle is equal to the combined area of 2 squares.



Consider asking students:

- “Two small triangles can be arranged to match up exactly with a square. What does that tell us about their areas?” (The 2 triangles and the square have the same area.)
- “Two small triangles can also be arranged into a medium triangle. What does that tell us about the area of the medium triangle?” (It is the sum of the areas of the 2 small triangles. It is twice the area of a small triangle. It is the same as the area of a square.)

2.5 Tangram Rectangle

Cool-down

5 min

Standards

Addressing **6.G.A.1**

Launch

Math Community
Before distributing the *Cool-downs*, display the Math Community Chart and the community building question “Is there anything that you would like to add to the student ‘Doing Math’ section of the chart?” Ask students to respond to the question after completing the *Cool-down* on the same sheet.

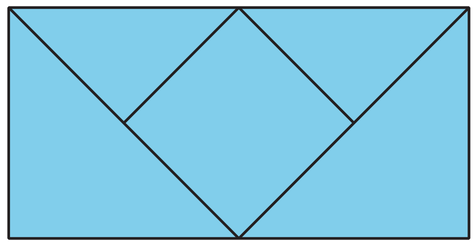
After collecting the *Cool-downs*, identify themes from the community building question. Use the themes to add to or revise the student section of the Math Community Chart before Exercise 3.

Give students access to the tangram shapes and geometry toolkits. Tell students that this figure is composed of two small right triangles, two medium right triangles, and a square, just like the ones they used earlier.

Note that students might not, at first, see the "square in the middle" as a square, or they might think of it a diamond (which would have unequal angles). Make sure that everyone understands that square-ness does not depend on how we turn the paper: A square is a rectangle (four right angles) that has 4 equal sides.

Student Task Statement

The square in the middle has an area of 1 square unit. What is the area of the entire rectangle in square units? Explain your reasoning.



Student Response

4 square units. Sample reasoning:

- Put together the two small triangles to make a square. Its area is 1 square unit. Decompose each medium triangle into two small triangles that can be arranged as a square. Each of these squares has an area of 1 square unit. Together with the square in the middle, the sum of the areas of these pieces is 4 square units.
- A small triangle has an area of $\frac{1}{2}$ square unit, and a medium triangle has an area of 1 square unit. $1+1+1+\frac{1}{2}+\frac{1}{2}=4$

Responding to Student Thinking

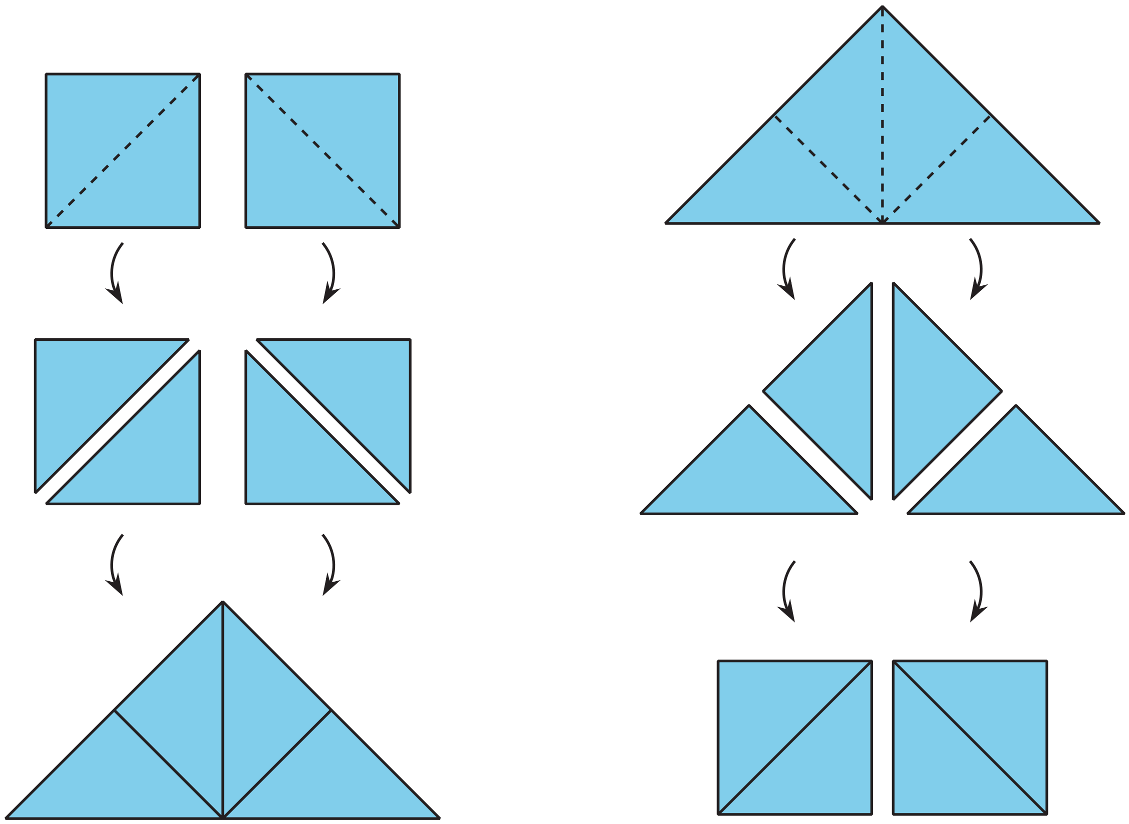
More Chances
Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.

Lesson 2 Summary

Here are two important principles for finding **area**:

1. If two figures can be placed one on top of the other so that they match up exactly, then they have the *same area*.
2. We can *decompose* a figure (break a figure into pieces) and *rearrange* the pieces (move the pieces around) to find its area.

Here are illustrations of the two principles.



- Each square on the left can be decomposed into 2 triangles. These triangles can be rearranged into a large triangle. So, the large triangle has the *same area* as the 2 squares.
- Similarly, the large triangle on the right can be decomposed into 4 equal triangles. The triangles can be rearranged to form 2 squares. If each square has an area of 1 square unit, then the area of the large triangle is 2 square units. We also can say that each small triangle has an area of $\frac{1}{2}$ square unit.

Glossary

- area

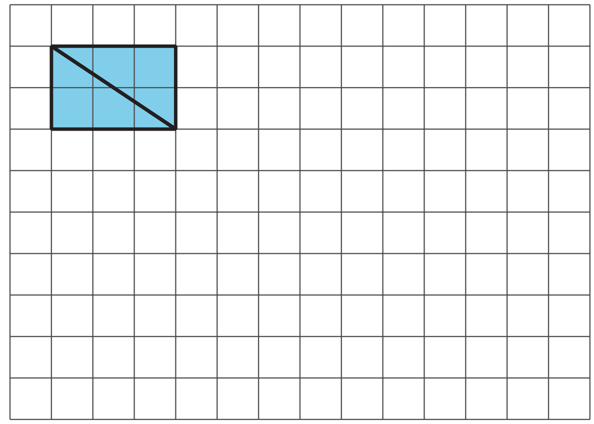
Lesson 2 Practice Problems

1 Student Task Statement

The diagonal of a rectangle is shown.

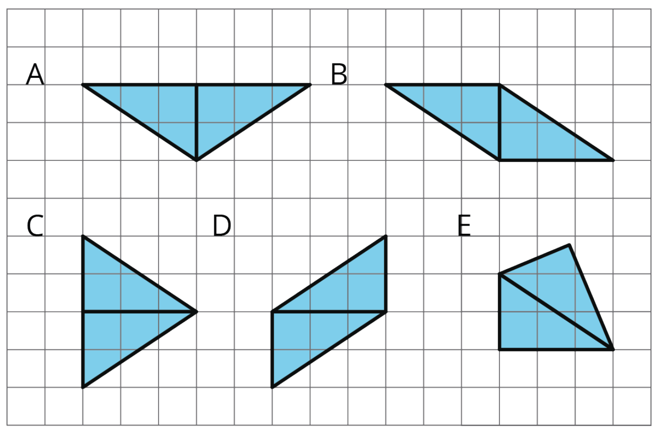
a. Decompose the rectangle along the diagonal, and recompose the two pieces to make a *different* shape.

b. How does the area of this new shape compare to the area of the original rectangle? Explain how you know.



Solution

a. Sample responses:

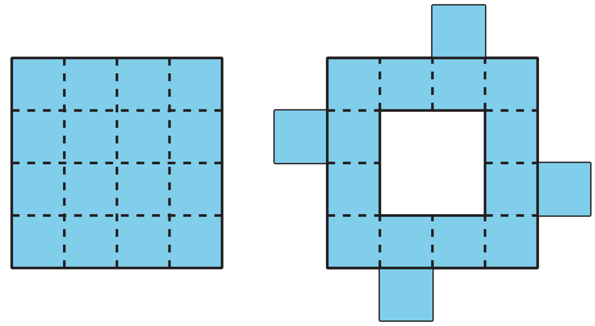


b. The areas are the same. Sample reasoning: All of the shapes are composed of two copies of the same triangle.

2 Student Task Statement

Priya decomposed a square into 16 smaller, equal-size squares and then cut out 4 of the small squares and attached them around the outside to make the new figure shown.

How does the area of the new figure compare with that of the original square?



A. The area of the new figure is greater.

B. The two figures have the same area.

C. The area of the original square is greater.

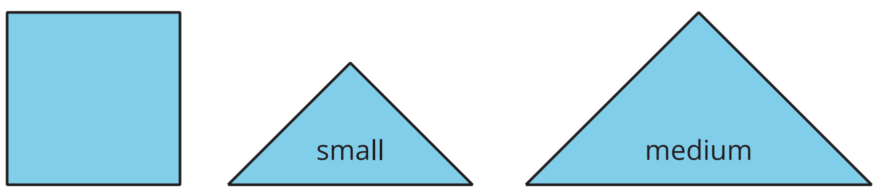
D. We don't know because neither the side length nor the area of the original square is known.

Solution

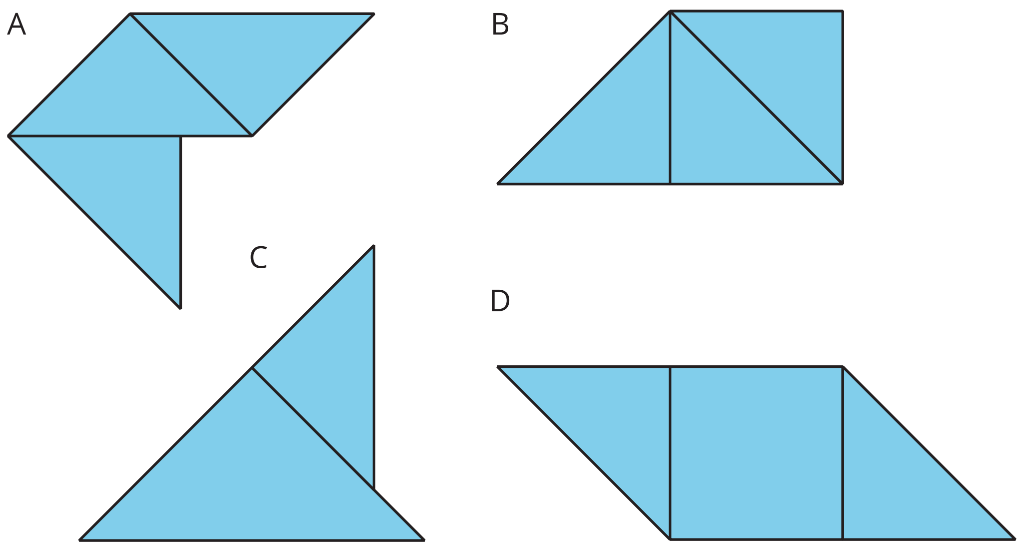
B

3 Student Task Statement

The area of the square is 1 square unit. Two small triangles can be put together to make a square or to make a medium triangle.



Which figure also has an area of $1\frac{1}{2}$ square units? Select **all** that apply.



A. Figure A

B. Figure B

C. Figure C

D. Figure D

Solution

A, B, C

4 from an earlier course

Student Task Statement

The area of a rectangular playground is 78 square meters. If the length of the playground is 13 meters, what is its width?

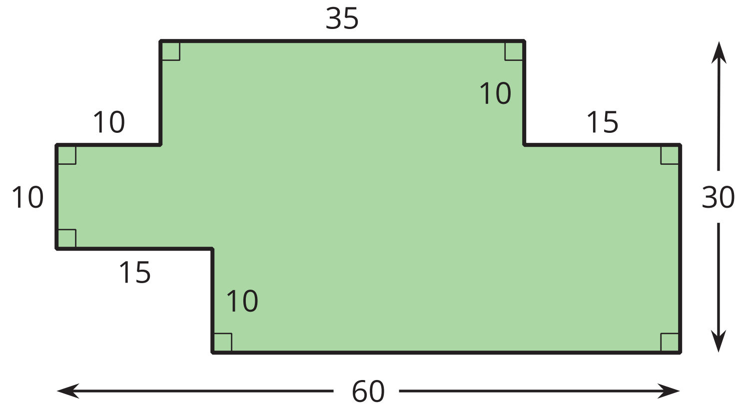
Solution

6 meters

5 from Unit 1, Lesson 1

Student Task Statement

A student said, “We can’t find the area of this shaded region because the shape has many different measurements, instead of just a length and a width that we could multiply.”



Explain why the student's statement about area is incorrect.

Solution

Sample response: Area measures how many unit squares cover a region without gaps or overlaps. We multiply a length and a width when finding the area of a rectangle because that product tells us the number of unit squares in it. We can still find the area of a shape as shown, but first we will need to break it apart into rectangles whose areas we can find and then add them to find the total area. We can also enclose the 30-by-60 region with a rectangle, find its area, and subtract the areas of the unshaded portions.

