Finding Area By Decomposing and Rearranging

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Lesson 2

CCSS Standards: Building on	• 3.MD.C.5.b
CCSS Standards: Addressing	• 6.G.A.1
CCSS Standards: Building towards	• 6.G.A

Let’s create shapes and find their areas.

Today's Goals

- ❏ I know what it means for two figures to have the same areas.
- ❏ 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.

What is Area?

...

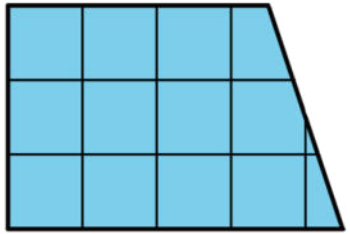
Warm Up 2.1

- Think Pair Share

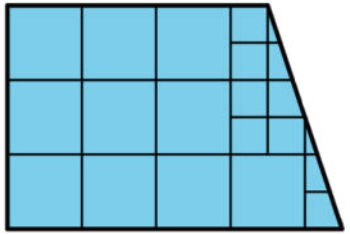
Here are four drawing that show squares inside a shape.

1. Select all drawings whose squares could be used to find area of the shape.
2. Write a definition of area that includes all the information that you think is important.

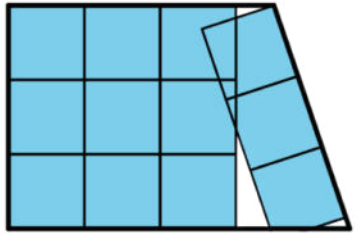
A



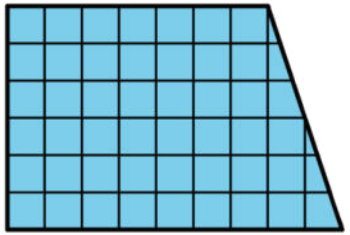
B



C

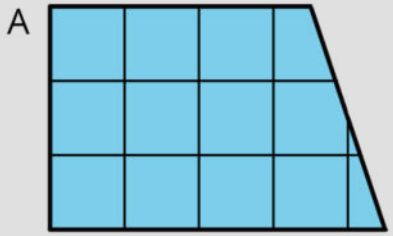


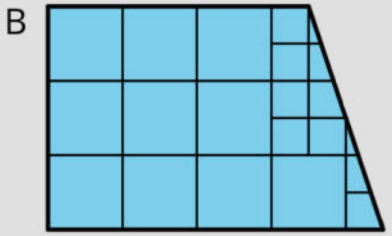
D

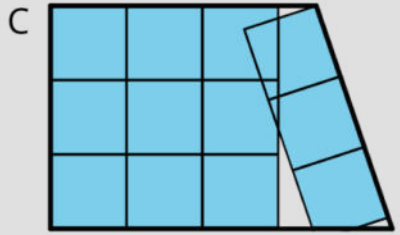


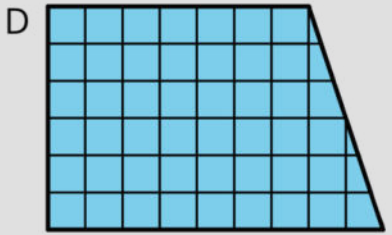
_____

- What is it about A and D that can help us find the area?
- What is it about C that might be unhelpful for finding area?
- If you think B cannot be used to find area, why not?
- If you think you can use B to find area, how?







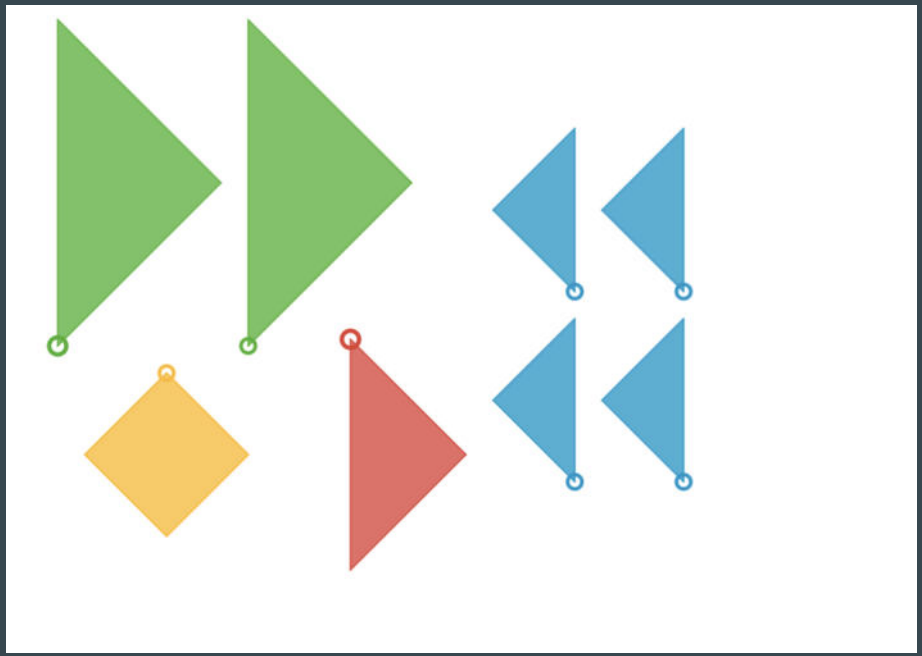


Composing Shapes

Activity 2.2

- Think Pair Share

Composing Shapes

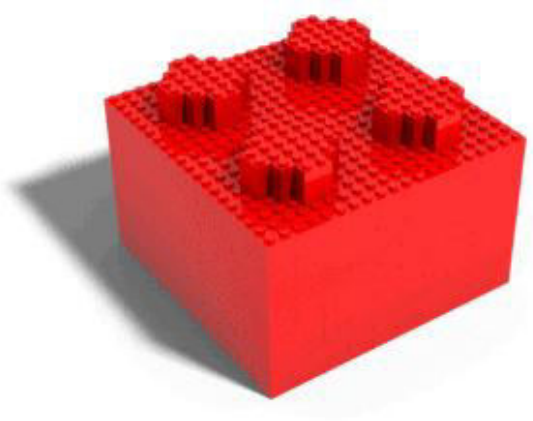


You have one square and some small, medium, and large right triangles. The area of the square is 1 square unit.

1. Notice that you can put together two small triangles to make a square. What is the area of the square composed of two 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.

Let's Share Our Ideas!

We say that if a region can be placed on top of another region so that they match up exactly, then they have the same **area.**

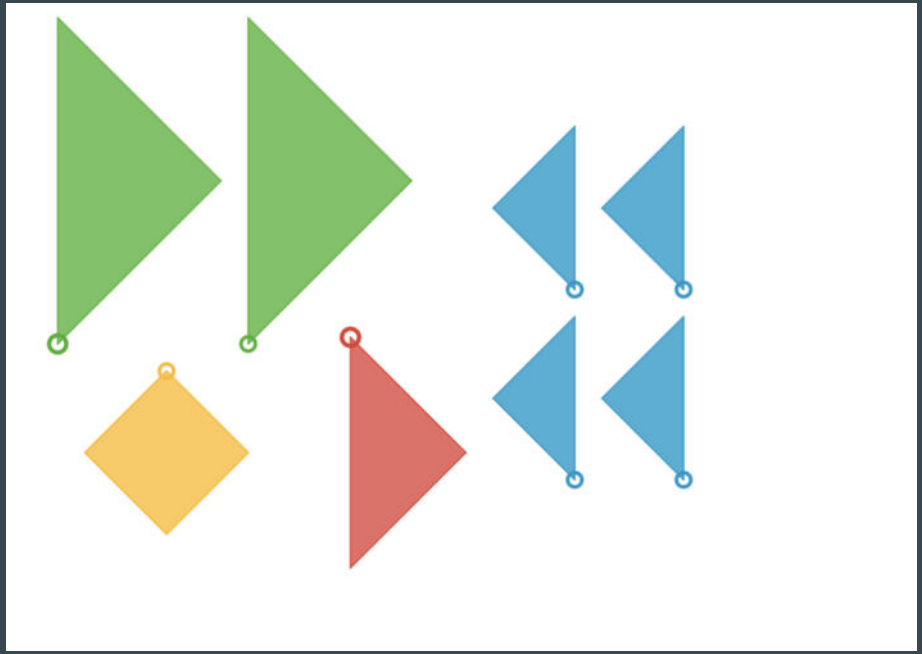


Tangram Triangles

Optional Activity 2.3

- Think Pair Share

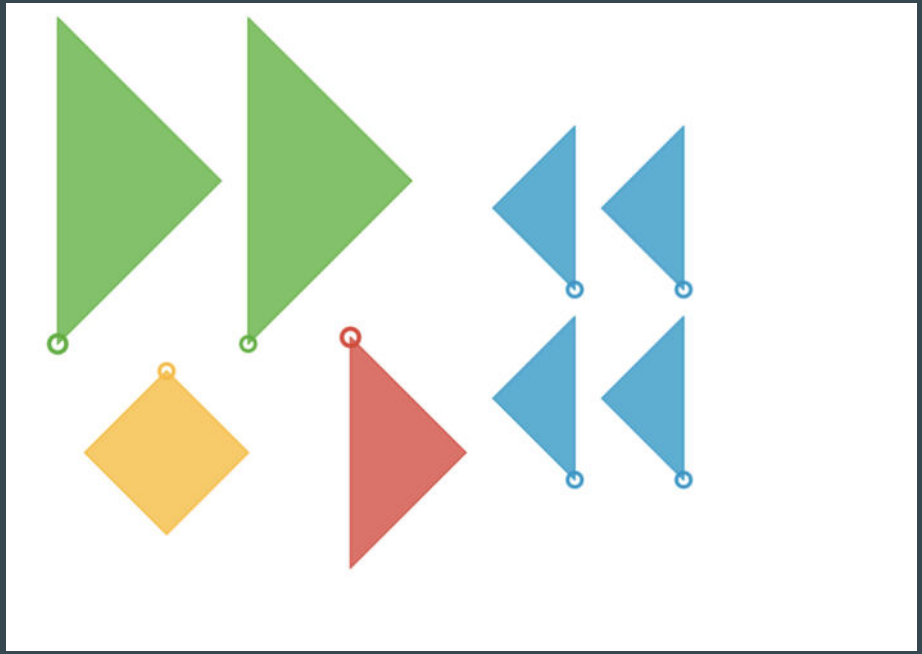
Tangram Triangles



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 . . .

Tangram Triangles

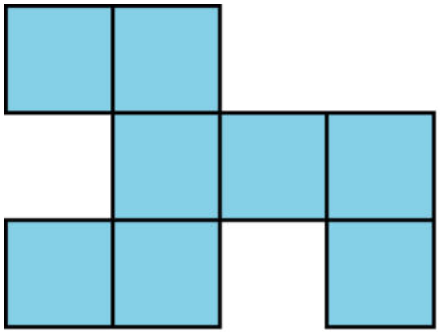


1. Did you and your partner use the same strategy to find the area of each triangle?
2. How were your explanations similar? How were they different?

area

The area of a two-dimensional region, measured in square units, is the number of unit squares that cover the region without gaps or overlaps.

The side length of each square is 1 centimeter. The area of the shaded region A is 8 square centimeters. The area of shaded region B is ½ square centimeters.



A

B

rearrange

The area of a two-dimensional region, measured in square units, is the number of unit squares that cover the region without gaps or overlaps.

The side length of each square is 1 centimeter. The area of the shaded region A is 8 square centimeters. The area of shaded region B is ½ square centimeters.

compose/ decompose

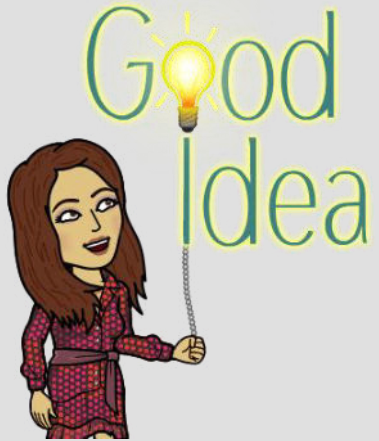
Compose means “put together” and decompose means “take apart.” We use the word “compose” to describe putting several geometric figures together to make a new figure.

Big Idea # 1

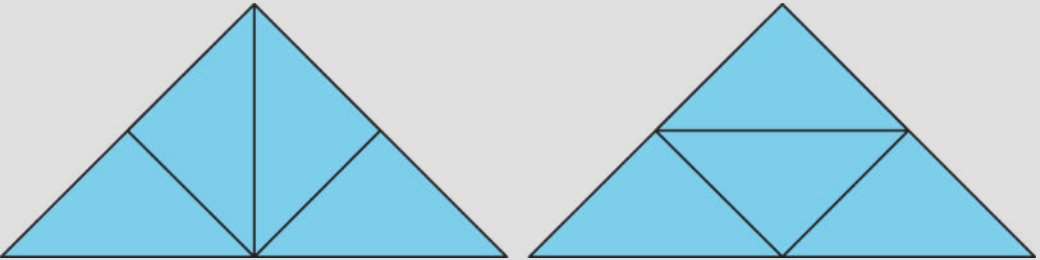
If two figures can be placed one on top of the other so that they match up exactly, then they have the same area.

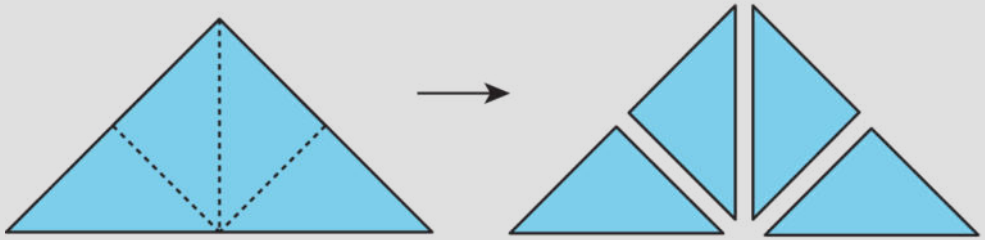
Big Idea # 2

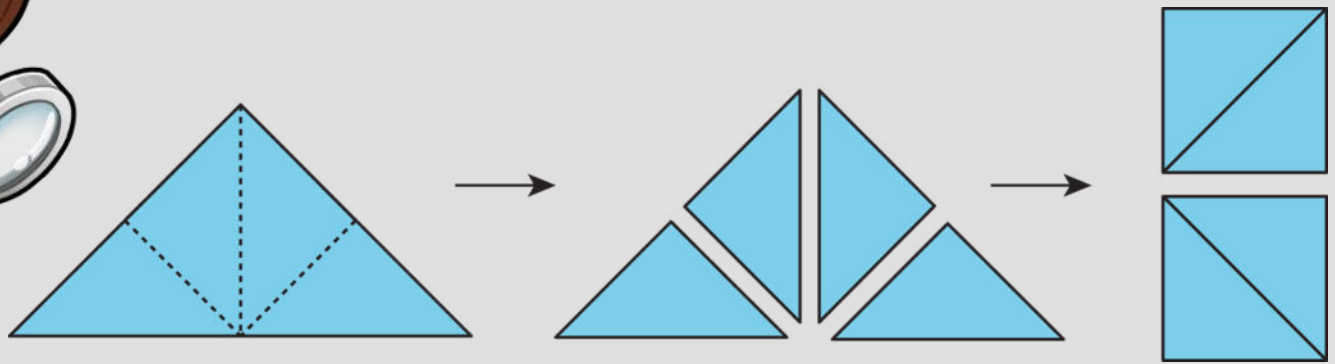
The area of a figure can be found by adding the areas of its parts. If we **compose** (put together) a new figure from smaller pieces without overlapping them, then the sum of the areas of the pieces is the area of the new figure. Likewise, if we **decompose** (cut or break apart) a given figure into pieces, then the area of the given figure is the sum of the areas of the pieces. Even if we **rearrange** the pieces, the overall area does not change.



Let's Take a Look







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Tangram Rectangle

Cool Down 2.1