

ESTABLISHING PURPOSE

1

**What are the key content standards I will focus on in this lesson?**

Content Standards:

7.G.B

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

7.G.B.4

Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

7.EE.A.1

Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

Standard for Mathematical Practice:

- Construct viable arguments and critique the reasoning of others.

2

**What are the learning intentions (the goal and why of learning stated in student-friendly language) I will focus on in this lesson?**

*Content:* I am learning to develop an understanding of the area formula for circles.

*Language:* I am learning to use appropriate vocabulary and notation when communicating our thinking about circles.

*Social:* I am learning to support the explanation of the relationship between circumference and area in a circle using dialogue and thoughtful questioning.

3

**When will I introduce and reinforce the learning intention(s) so that students understand it, see the relevance, connect it to previous learning, and can clearly communicate it themselves?**

I will introduce the learning intentions in the middle of the lesson, after students have constructed their parallelograms (and see the relationship generally) and before beginning work on the formula. This allows them to discover the big idea of the lesson and gives purpose for moving to the more procedural element, finding the formula.

## SUCCESS CRITERIA

4

**What evidence shows that students have mastered the learning intention(s)? What criteria will I use?**

I can statements:

- I can rearrange parts of a circle to form a shape whose area I know.
- I can identify the radius and circumference of the original circle in the new figure.
- I can tell how to find the area of the new shape using the dimensions of the circle.
- I can explain the relationship between the circumference and area of the circle.
- I can calculate the area of a circle when I know the radius or diameter.

5

**How will I check students' understanding (assess learning) during instruction and make accommodations?**

I will observe the following:

- Students creating "parallelograms" appropriately and finding the radius and circumference of the starting circle on their figure.
- Students using the formula for area of a parallelogram correctly.
- Students explaining their steps in deriving the formula for the area of a circle.

I will provide peer support if needed. This part is also less important as long as students can apply the formula and describe where it comes from.

I will see that students recognize closer approximations of a parallelogram with smaller wedges of the circle.

## INSTRUCTION

6

**What activities and tasks will move students forward in their learning?**

I will discuss area of a circle and how counting squares isn't an easy strategy here. I will provide fraction circle pieces and have students explore constructing "parallelograms" with the pieces. I will move toward seeing that the height of the figure is the radius and the length of the base is half the circumference.

I will share the learning intention at this point and move toward deriving the formula. Depending on time and class energy, this part may be more deliberate instruction. I will allow practice at the end using the formula to find the area of several circles.

## 7

### What resources (materials and sentence frames) are needed?

1. Fraction circles (at least wholes, fourths, and eighths; tenths or twelfths are helpful as well)
2. Calculators

## 8

### How will I organize and facilitate the learning? What questions will I ask? How will I initiate closure?

1. Students will work in pairs to create their figures and share understanding through groups of four. I will ask the following questions:
  - Where do you see the circumference and radius of the circle in your figure?
  - How does your figure change when you have more wedges?
  - How can we use what you've done to find a formula for the area of a circle?
2. Closure brings the focus back to using the formula correctly with a brief practice session, extending into homework if necessary.