

Subject/Grade: Mathematics 7

Lesson Title: Learning Areas Using Fences

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Stage 1: Identify Desired Results

Outcome(s)/Indicator(s):

[SS7.1](#)

Demonstrate an understanding of circles including circumference and central angles.

- a) Identify the characteristics of a circle.
- b) Define and illustrate the relationship between the diameter and radius of a circle
- c) Generalize, from investigations, the relationship between the circumference and the diameter of a circle.
- d) Solve problems involving circles.

[SS7.2](#)

Develop and apply formulas for determining the area of

- **triangles**
- **parallelograms**
- **circles.**
- a) Generalize, using examples, a formula for determining the area of triangles.
- b) Generalize, using examples, a formula for determining the area of parallelograms.
- c) Generalize a formula for finding the area of a circle.
- d) Solve problems involving the area of triangles, parallelograms, or circles.

Key Understandings: ('I Can' statements)

- I can identify the characteristics of a circle.
- I can identify the relationship between the diameter and radius of a circle.
- I can determine the area of a circle, triangle, and parallelogram using a formula.
- I can determine which area is the largest.
- I can solve problems involving the area of triangles, parallelograms, or circles.
- I can find the radius of a circle using the circumference.
- I can manipulate the sizes of a parallelogram to maximize the area.

Essential or Key Questions:

- What is the relationship between different shapes and the growth or reduction of the area?
- How can I calculate, compare, and contrast the area of a circle, rectangle, and triangle?
- How can I identify if my conjectures are correct? Which processes aid my resolution?

Prerequisite Learning:

Student should recall information regarding

- Formulas for the area of a triangle, rectangle, and a circle
- Formula for the circumference of a circle
- Understanding the concepts of radius, circumference, area, and perimeter
- Pi and what it equals to

Instructional Strategies:

Delete The Textbook

- Students will be introduced to a visual of the question and be asked questions surrounding more information required

Thinking Classrooms

- Students will be asked to solve problems in small groups on a vertical non-permanent surface. Students will be encouraged to engage with each others problem's solving processes and ask thinking questions. Students will be expected to create conjectures through processes of generalization and specialization.

Three-Act Task

- The creation of questions related to Dan Meyer's concept of in Act 1 of the 3-Act Tasks.

Visual Interpretation

- Students will be shown a visual and asked to create different rectangles, triangles, and circles representing their progress toward the result.

Discussion

- At the end, we will allow students to describe how they came up with their results. Students become discussion leaders.

Stage 2: Determine Evidence for Assessing Learning

There will be a thumbs assessment (thumbs up, thumbs down, or thumbs to the side) before students advance to a new skill. In this lesson plan, this will occur between stages one and two of the development portion of the lesson.

Student Self Assessment (Exit Slip):

1 meaning I am not confident in my skills and/or behaviours, and 10 being I am highly confident in my skills/behaviours.

On a scale from 1-10, how do you feel you contributed to group discussion and problem-solving?

1	2	3	4	5	6	7	8	9	10
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On a scale from 1-10, do you feel you were heard within your group and acknowledged others' ideas as well?

1	2	3	4	5	6	7	8	9	10
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On a scale from 1-10, do il understand the area formulas and mathematical process our class and group followed in seeking resolution?

1	2	3	4	5	6	7	8	9	10
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Teacher Observational Assessment (To be completed as the class works):

Name: _____

Objective	Approaching	Acceptable	Utilized
Evidence of Critical thinking processes, strategies, and skills. (e.g. Conjectures, generalizing, specialization, visuals, etc.)			
Evidence of communication and participation (e.g. contribution to group discussion and content-based learning)			
Evidence of Knowledge-Based and Inquiry-Based learning. (e.g. Does the student(s) draw on class content? Does the student(s) use an educated approach rather than guessing?)			

NOTE: Student exit slips in combination with the teachers' observational assessment will be used to conclude the students' grade.

Stage 3: Build Learning Plan

Set (Engagement):

Length of Time: 5 mins

Teachers will introduce words like “36 fences” and shapes like the triangle, square, and circle. The teachers will then ask: **“What do you think will be questioned using these words and shapes shown to you?”**

Teachers will then collect the potential questions suggested by students and will choose the most significant questions.

NOTE: the teacher may need to lead the students towards more mathematical concepts, such as questions retaining the area.

The questions regarding area will be considered, and the teacher will resolve this stage by asking students, **“which is the largest and smallest area we can find from rectangular shapes?”**

Students will then be grouped into groups of 3 randomly using cards. They will pull a random card from the deck and find students who have the same number as them.

NOTE be sure only to keep 3 cards of each number in the deck as well as incorporate the same amount of numbers as groups

Then the actual task starts from there.

Development:

Length of Time: 30-35 mins

Once the class has gathered enough information about their task, they will have time to solve the areas of rectangles first. If some groups finish early, teachers will ask these groups to find the smallest area.

When most groups have solved the given tasks, teachers will ask the students to show a thumbs up, down, or side to assess their confidence in the first task briefly.

After recording the feedback, teachers introduce other shapes like triangles and circles. Teachers will ask the students to calculate the largest area among the three shapes. If some groups finish early, ask them to calculate the smallest area. Teachers will ask: **Which shape will have the biggest and smallest area possible?**

Learning Closure:

Length of Time: 5 mins

Teachers will stop the class activity and gather everyone. Teachers will guide the whole class on one whiteboard created by a group and have that group explain their calculations.

NOTE: this will be a student-led discussion where they explain how they found their resolution.

Students will then be given an exit slip to complete independently. The teacher will instruct them to highlight or circle which number they feel applies to them.

Materials/Resources:

- Deck of cards (for dividing students into groups)
- 6 vertical non-permanent surfaces (whiteboards are ideal)
- At least 6 whiteboard markers
- At least 6 whiteboard erasers
- Some form of projection to supply students with initial visual (if a projector is not provided, students may be provided with a paper copy)
- [Exit Slip](#) Copies for each student.

Possible Adaptations/ Differentiation:

- When introducing triangles and circles, require students to change who writes on the whiteboard.
- If students feel overstimulated or uncomfortable with random partnerships, group selection can be adapted to place students strategically into groups that provide comfort.
- Encourage students to work together. If a group is explicitly struggling, suggest they work with a group beside them.

Management Strategies:

- Smile and Walk away: when students start to ask “stop thinking questions,” they will be greeted with a smile and silence.
- Ask three before me: Before asking a question to the teacher, ask three peers. This technique will promote classroom collaboration.

Safety Considerations:

- Students should understand expectations of how to collaborate with one another appropriately.
- If a student struggles to be heard, other students should advocate for them. If the problem progresses, it should be brought up to the teacher and/or support staff.

Stage 4: Reflection

Will record after the learning task.