

Bachelor of Education (Elementary) & Bachelor of Education (Secondary) STEM Lesson Plan

Lesson Title: Calculating Area: How close to 100 **Lesson #** 3 **Date:** Feb. 3, 2023

Name: Christina **Subject:** Math **Grade(s):** 5

Rationale:

This lesson is important because it will review previously learned math concepts using area of a square and a rectangle in context of a larger space than an item itself occupies. Students will have previous knowledge of measurement and perimeter. Students will have some previous knowledge of placing shapes and a 100 grid. Paired with this, students will use knowledge of probability to make predictions on the number of shapes occupy the 100 grid. Students will learn that an object can be moved up and down and side to side without changing the area of a shape. This will prepare students for future learning involving translations. This will later be useful for real-life scenarios using area of objects, comparing between two objects and the movement of an object within a larger space than it occupies.

Core Competencies:

Communication	Thinking	Personal & Social
<p>Students communicate with intention and purpose.</p> <p>Students combine their efforts with those of others to effectively accomplish learning and tasks. As members of a group, they appreciate interdependence and cooperation, commit to needed roles and responsibilities, and are conscientious about contributing.</p>	<p>Students apply critical, metacognitive, and reflective thinking in given situations, and relate this thinking to other experiences, using this process to identify ways to improve or adapt their approach to learning. They reflect on and assess their experiences, thinking, learning processes, work, and progress in relation to their purposes.</p> <p>Students learn to engage in inquiry when they identify and investigate questions, challenges,</p>	<p>Students value themselves, their ideas, and their accomplishments.</p> <p>Students build and maintain diverse, positive peer and intergenerational relationships. They are aware and respectful of others' needs and feelings and share their own in appropriate ways.</p>

Big Ideas (Understand)

Closed shapes have area and perimeter that can be described, measured, and compared.

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies	Learning Standards - Content
<p>CC 6: Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.</p> <p>CC7: Visualize to explore mathematical concepts.</p> <p>CC 9: Engage in problem-solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures.</p> <p>CC10: Communicate mathematical thinking in many</p>	<p>C12: Area of measurement of squares and triangles.</p> <p>C13: Relationships between area and perimeter.</p> <ul style="list-style-type: none"> - Measuring area using squares and rectangles, using tiles, geoboards, and grid paper - Single transformations (slide translation/ flip translation, flip/reflection, turn/rotation)

ways.	
CC 12: Explain and justify mathematical thinking and decisions.	
CC15: Reflect on mathematical thinking.	

Instructional Objectives & Assessment

Instructional Objectives (students will be able to...)	Assessment
<ul style="list-style-type: none"> • Students will understand the formula of area for a rectangle and a square. • Students will understand what a squared unit is. • Students will understand using length and width how to place a rectangle and square on a hundred grid. • Students will have an emerging knowledge of how the movement of a shape within a 100 grid can change the way we view it (single transformations). • Students will be able choose a placement on the grid with knowledge that placement on the grid does not change the item's area. 	<ul style="list-style-type: none"> • Use of active listening, communication skills and participation during interactive lesson discussion. • Display knowledge through the assigned group task "How close to 100" (strategic placements, can justify reasoning for predictions) • Display knowledge of the ability to move a shape on a 100 grid through spatial awareness and knowledge of probability relative to the roll of the two dice. • Student justification of shape placement/ length and height choices on the grid.

Prerequisite Concepts and Skills:

Students will have prior knowledge of area of a rectangle and square, using a 100 grid and probability.

Indigenous Connections/ First Peoples Principles of Learning:

Recognition that learning is embedded in memory and learning involves patience and time.

Universal Design for Learning (UDL):

Write and review area of rectangle and a square on the board. Give verbal instructions for the activity. Use a volunteer to visibly practice this activity.

Differentiate Instruction (DI):

Partner student with difficulties reading and calculating formula with students that have adequate knowledge of the strategies. Have student copy formulas on worksheet and allow use of calculator.

Materials and Resources

- White board, coloured whiteboard markers (Draw a 100 grid on the whiteboard)
- Coloured markers (30)
- Coloured dice (30)
- <https://curriculum.gov.bc.ca/>
- <http://www.fnesc.ca/first-peoples-principles-of-learning/>
- <https://www.ashleigh-educationjourney.com/teaching-area-and-perimeter/> (modified)
- How Close to 100? <https://www.youcubed.org/tasks/how-close-to-100/> (modified to allow area formula to be complete used squared units for answers.)
- 100 grid worksheet (double sided)

Lesson Activities:

Teacher Activities	Student Activities	Time
<p>Introduction (anticipatory set – “HOOK”):</p> <p>HOOK</p> <p>Before class begins</p> <ul style="list-style-type: none"> • Draw a grid on the board. • Design a “carnival.” • Draw a square with a Ferris Wheel in it on a (3x3 on the grid) and draw a rectangle with a cotton candy stand in it (1x2 on the grid), draw rectangle with a bumper car tack in it (2x3 on the grid) Ensure there is at least one square between each item at the carnival. <p>During the beginning of class</p> <ul style="list-style-type: none"> • Discuss Area of the items on the white board. • Ask students to think about what else you would add keeping in mind there must but at least 1 square between items. • Ask how they could change to put the most items on the grid (how many do they get?) 	<ul style="list-style-type: none"> • Students will use active listening skills. • Allow for student engagement in figuring out length x width. • Share with desk partner what your choice is a what the area would be. 	<p>10 min</p>
<p>Body:</p> <p>Activity (How Close to 100)</p> <p>Step 1:</p> <p>Divide class into groups of 2.</p> <p>Hand out per pair: one 100 grid worksheet and 4 dice (2 per student). 10 pack of coloured markers to share.</p> <p>Step 2:</p> <p>Review probability concept:</p> <ul style="list-style-type: none"> ○ Ask: When rolling dice, can we determine that there is a level of probability with each roll? (2 dice 6 sides on each dice) 	<p>Students will listen to direction, sit in groups of 2, receive 100 grid worksheets, 4 dice and 10 pack of coloured markers.</p> <p>Students will engage in active discussion about probability and</p>	<p>5 min</p>

<ul style="list-style-type: none"> ○ Is there a possibility that we will be able to fill the 100 grid with squares and rectangles to fill the 100 grid entirely? ○ Ask each group to predict how many shapes they think their group will fit on the 100 grid? <p>Step 3</p> <p>Discuss objective of the activity and have students work with their partner to complete.</p> <ul style="list-style-type: none"> ○ Go through example visually using dice, 100 grid on the white board and coloured whiteboard marker. Using the instructions as follows: ○ Objective to fill the 100 grid with squares and rectangles as close as possible to 100. (Try to fill entire grid) ○ Roll 2 dice to create length and width of the rectangles and squares. ○ Instruct students to complete the formula for the area of each item as indicated on the worksheet. ○ Students will be asked to draw their shapes rolled on the 100 grid (students may choose the placement on where their shape is drawn on the 100 grid so long as it does not take up the space of another existing shape. <p>Step 4</p> <p>Teacher circulates classroom during activity to observe and show availability for any questions.</p>	<p>predictions.</p> <p>Students will write down their predictions.</p> <p>Students will listen to instruction.</p> <p>Students will have the opportunity to ask questions for clarity, and cooperatively work with their partner to complete the worksheet.</p> <p>Students will work collaboratively to roll the dice, draw the shapes with coloured markers and write the area formula for each specific shape as they roll. Students will take turns.</p>	<p>5 min</p> <p>15 min</p>
<p>Closure:</p> <p>Discuss with class how they found the activity. Get groups to calculate how close to 100 they got on the 100 grid.</p> <p>Ask: What were their predictions and how close were they</p>	<p>Students will use active listening skills and answer questions.</p>	<p>5 min</p>

<p>to the actual result?</p> <p>Ask: Did the object change area if it was moved side to side/ up and down. Introduce language for “translation” and its definition relative to the activity students just completed.</p> <p>Thank students for their participation in this activity.</p>	<p>Students from each group will engage in discussion, calculate how close they got to 100 on the 100 grid/ their predictions and strategies they used.</p> <p>Discuss what strategies they used.</p> <p>Students will use active listening skills</p>
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Organizational Strategies:

Use standard 2 desks side by side for classroom layout. Students are to be paired in groups of 2 (if there is an odd number there may be one group of 3.)

Proactive, Positive Classroom Learning Environment Strategies:

During the activity I will have proximity to observe students. Allow proximity to be close enough for individuals to ask questions while activity is occurring. Engage with students while the activity is occurring: Ask strategies, observe formulas. Observe to see if students are mixing up the formulas for area and perimeter?

Extensions:

If groups finish early, they can do the activity again on the backside of the paper, calculate the perimeter of each shape on their 100 grid and help to support other groups in their placement strategies.

Reflections (if necessary, continue on separate sheet):

As an educator, you really need to know your students and their capabilities walking into the activity. It is important to try out your activities before class to have an idea of how they may work for practical use.