UNIT PLANNING TEMPLATE- PERIMETER, AREA, CIRCUMFERENCE

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|  | **Unit Topic / Guiding Question: Perimeter, Area, and Circumference.** | | | | | | |
|  | **Rationale:**  **Students continue to build and complexify skills from previous grades. Along with the background knowledge coming from previous grades, students have also been working on angles and triangles. Moving forward, perimeter and area link directly to triangles while extending to other polygons such as rectangles, parallelograms, and trapezoids. After students begin to understand perimeter and area, their knowledge can be applied to more complex shapes such as circles. Circles allow students to extend their knowledge of perimeter into circumference and calculate the area within.** | | | | | | |
|  | **STAGE 1: Desired Results** | | | | | | |
|  | **UNDERSTAND** | **Big Ideas** | | | **Essential Questions** | | |
| *Properties of objects and shapes can be described, measured, and compared using, area, perimeter, and circumference.* | | | *How can the properties of objects and shapes be described, measured, and compared using area, perimeter, and circumference?* | | |
|  | **DO** | **Core Competencies:** | | | | | |
| **Communication** | **Thinking** | | | **Personal & Social** | |
| * Communicating * Collaborating   - I can use what I know and observe to identify problems and ask questions. I explore and engage with materials and sources. (Critical Thinking)  - In discussions and conversations, I am focused and help to build and extend understanding (Communication)  - I contribute during group activities, cooperate with others, and listen respectfully to their ideas. I can work with others for a specific purpose. (Collaboration) | * Creative Thinking * Critical & Reflective Thinking | | | * Personal Awareness & Responsibility * Positive Personal & Cultural Identity * Social Awareness & Responsibility | |
|  | **Learning Standards – Curricular Competencies:**  **- Model mathematics in contextualized experiences**  **- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving**  **-**  **Communicate mathematical thinking in many ways** | | | | | |
|  | **KNOW** | **Learning Standards - Content:**  **- perimeter of complex shapes**  **- area of triangles, parallelograms, and trapezoids**  **- circumference and area of circles** | | | | | |
|  | **First Peoples Principles of Learning** | * *Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.* * *Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).* * *Learning involves recognizing the consequences of one’s actions.* * *Learning involves generational roles and responsibilities.* * *Learning recognizes the role of indigenous knowledge.* * *Learning is embedded in memory, history, and story.* * *Learning involves patience and time.* * *Learning requires exploration of one’s identity.* * *Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations.* | | | | | **Comments on how you will address the FPPL:**  **Perimeter and area have lots of connections that continue to be built on throughout various skills. Starting with perimeter and moving into area, the connections are built making it easier for students to see the similarities of this new knowledge being shared.** |
|  | **STAGE 2: Assessment Plan** | | | | | | |
|  | **Formative Assessment (Assessment as Learning and Assessment for Learning):** | | | | | | |
|  | *- Self-assessments throughout practice lessons to determine where students are at throughout the introduction of new skills and information: Towards the end of the lesson, the teacher will ask students to erase their whiteboards or at the top of the paper and record a number between 1 and 4.* 1= no idea what is going on (in relation to the math) 2= beginning to understand, still need some questions answered, 3= I can confidently do this independently. 4= I can confidently do this independently and teach this to someone new.  *- After each week students will complete a task (sheet, game, etc.) based off the topic covered that week. Teacher will collect and review these tasks to ensure that students are ready to continue or if more practice/review is needed.*  *- - “Help Ms.Payne” activity where students are asked to create their own test questions and to show their work to determine where students are at. At the beginning of this activity, teacher will open the lesson by asking students to write their own test. Out of excitement, they will begin making ideas in their heads or quietly discuss with the person beside them. Before students begin, teacher will explain that she needs to make sure everything that they have learned together so far is covered within this test. On the board the teacher will lay out the expectations (1 perimeter rectangle question, 1 perimeter irregular shape question, 1 perimeter unknown side question, etc.) At the end, each student has now completed a question of their own learning in each of the different topics covered. This can show student understanding about perimeter and area.* | | | | | | |
|  | **Summative Assessment (Assessment of Learning):** | | | | | | |
|  | *- Perimeter and Area test (Lessons 1-12) students will complete a final task to show their understanding of finding perimeter of regular and irregular shapes with both known and unknown sides. As well as area of rectangles, triangles, parallelograms, and trapezoids. On this test, it will include exact examples from classroom work (no surprises), so students understand exactly what to expect on the test.*  *- Circles test. After the circles part of this unit (Lessons 12-17) students will complete a final task to show their understanding of circumference and finding the area of a circle. On this test, it will include exact examples from classroom work (no surprises) so students understand exactly what to expect on the test.* | | | | | | |
|  | **Stage 3: Learning Plan** | | | | | | |
| **Date/Lesson** | **Learning Intentions** | | | **Instructional Activities**  **(brief description here – lesson plans will be used to flesh out each lesson)** | | | |
| *Lesson 1* | *I can communicate what perimeter is and how to identify the perimeter of a polygon.*  *Curricular Competencies:*  *- develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.*  *-connect mathematical concepts to each other and to other areas and personal interests* | | | **Introduction to perimeter; students explain that perimeter is the distance or outer edge of a shape.**  **How can you find the perimeter? By adding up the sides of a shape.**  **With whiteboards, have students review perimeter by practicing with rectangles and squares (l + l + w + w)**  **After practice, have students self-assess and see how comfortable they are with rectangles and squares.**  **\* include word problems in practice.**  **Ex. Bob is building a new fence for his puppy. After measuring the yard, he knows that it is 10m x 12m x 10m x 12m. How much fencing does Bob need in total?**  **\*formative assessment- observing students and their answers to classroom discussions/questions** | | | |
| *Lesson 2* | *I can use manipulatives to visually represent perimeter of a shape.*  *Curricular Competencies:*  *- develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.*  *-model mathematics in contextualized experiences.* | | | **Continuation of perimeter, now with irregular shapes.**  **Using colour tiles, have students create a random shape and find the perimeter of it (if 1 side of the colour tile = 1cm) 🡪 have students use whiteboards to show their work**  **Then have students recreate another shape and trade with the person beside them 🡪 find the perimeter of the shape created by the other student.**  **\* include word problems in practice.**  **Ex. Jim is installing new carpet in his bedroom. He knows is bedroom is 5m x 4m x 15m x 6m x 8m. How much carpet does Jim need to buy in total?**  **\*formative assessment- observing students and their answers to classroom discussions/questions** | | | |
| *Lesson 3* | *I can continue to practice and understand perimeter for regular and irregular shapes.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.* | | | **Practice worksheet with regular and irregular shapes and perimeter on grid paper.**  **\*building a house activity:**  **🡪 students are given grid paper and the perimeter of each room. On the grid paper, students will be asked to determine the dimensions of each room based off the perimeter. For example, students will be given 10 different rooms:**  **Living room**  **Dining Room**  **Kitchen**  **Bedroom 1**  **Bathroom 1**  **Bedroom 2**  **Bedroom 3**  **Bathroom 2**  **Garage**  **Backyard**  **Using the perimeter of these 10 rooms, students will be asked to build the layout of the house. The expectations are that all 10 rooms are included, and students can include hallways, but the hallways must not have a perimeter greater than 6cm.**  **\*formative assessment- teacher will collect the bedroom sheets and see how students created their ‘house’ using perimeter.** | | | |
| *Lesson 4* | *I can identify the perimeter of an irregular shape with an unknown side.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.* | | | **Practice with perimeter using unknown sides.**  **Teacher will show students with her own example what an irregular shape with an unknown side looks like. After the teacher example, students will be given their own example for them to try on their own. Remind students that perimeter is the distance around (but other dimensions will be given so students can calculate each side.)**  **Teacher will provide students 4 more examples for them to work on.**  **\*formative- self-assessment using the 1-4 scale on how students feel about perimeter of unknown sides** | | | |
| *Lesson 5* | *I can practice finding perimeter of regular, irregular, and unknown sided shapes.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.* | | | **Perimeter practice 🡪 Spin the perimeter, students spin for 2 numbers and using those 2 numbers create a rectangle on grid paper (continue until grid paper is full)**  **After, students will receive an unknown side sheet to work on. (teacher will collect to determine understanding)**  **\*formative- teacher collects unknown side sheet to see student understanding** | | | |
| *Lesson 6* | *I can demonstrate how to calculate the area of a rectangle.*  *Curricular Competencies:*  *-model mathematics in contextualized experiences* | | | **Introduction to area, area is the space within the shape.**  **Ask students how to find the area of a rectangle (l x h) and have classroom discussions about what area is and what it can be used for.**  **Ask students to work together and determine the area of the classroom (using their feet as the measurement) 🡪 students will work in groups and walk around 2 sides of the classroom (one length and one width) to calculate the area.**  **Share answers (discuss why there is variety – size of feet)**  **After, have students calculate the area of 4 examples given either on a piece of paper or on the whiteboards (not being collected, formative practice)**  **\*formative- teacher observes students working together and in classroom discussions/asking questions** | | | |
| *Lesson 7* | *I can physically represent how triangles are related to other polygons in connection to their area formula.*  *I can calculate the area of a triangle.*  *Curricular Competencies:*  *-model mathematics in contextualized experiences* | | | **Continuation of area**  **Area of a triangle (bxh/2) like the area of the rectangle, other shapes have a formula to calculate its area.**  **Students take out a ruler and a small piece of white paper. Create and cut out a rectangle (lxw) after, ask students to cut the rectangle diagonally 🡪 demonstrating that the triangle is bxh/2 or the area of a rectangle divided by 2.**  **Measure and record the dimensions of one of your triangles using a ruler. Then trade with someone on the other side of the classroom – get them to move around and calculate the area of the triangle given to you. When finished, have students record the answer in the middle and tape their triangle up on the board.**  **Review and double check a few to determine if students are doing it correctly.**  **If time on whiteboards, practice drawing the triangles and finding the area of them.**  **\*formative- watching students and reviewing the process of calculating area together and demonstrating the why behind the formula.** | | | |
| *Lesson 8* | *I can physically represent how parallelograms are connected to other polygons in connection to their area formula.*  *I can calculate the area of a parallelogram.*  *Curricular Competencies:*  *-model mathematics in contextualized experiences* | | | **Continuation of area**  **Introduction of what a parallelogram is:**  **Area of a parallelogram (bxh) 🡪 using parallelogram images, demonstrate why the formula is bxh. Students will cut out an image of a parallelogram. Along the dotted lines of the 2 edges students will remove the two ‘triangle’ pieces. After, students will realize that they are leftover with a rectangle and the 2 triangle pieces make a rectangle, which explains why the area formula is the same as a rectangle.**  **Students will receive practice for parallelograms. Option to use a piece of paper or a whiteboard to complete the following questions.**  **\*formative- self-assessment using 1-4 scale see where students are at** | | | |
| *Lesson 9* | *I can collaborate with peers to calculate the area of a trapezoid.*  *Curricular Competencies:*  *-model mathematics in contextualized experiences* | | | **Continuation of area**  **Area of a trapezoid (a+b) h/2 \*most complicated 🡪 teach you must solve a+b before you divide h/2.**  **Discuss what is a trapezoid (short edge on top, long edge on bottom, connected diagonally).**  **In partners, have students draw and label dimensions of trapezoids and trade with the partner (find the areas of each other’s trapezoids)**  **After, students will have a trapezoid sheet to work through and get practice.**  **\*formative- practice with peers and verbal check in with students** | | | |
| *Lesson 10* | *I can show and demonstrate my understanding of perimeter of regular and irregular shapes and finding the area of polygons.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.*  *- model mathematics in contextualized experiences* | | | **Review:**  **- “Help Ms.Payne” activity where students are asked to create their own test questions and to show their work to determine where students are at. At the beginning of this activity, teacher will open the lesson by asking students to write their own test. Out of excitement, they will begin making ideas in their heads or quietly discuss with the person beside them. Before students begin, teacher will explain that she needs to make sure everything that they have learned together so far is covered within this test. On the board the teacher will lay out the expectations (1 perimeter rectangle question, 1 perimeter irregular shape question, 1 perimeter unknown side question, 1 area of a rectangle, etc.) At the end, each student has now completed a question of their own learning in each of the different topics covered. This can show student understanding about perimeter and area.**    **\*formative assessment- final practice before summative assessment** | | | |
| *Lesson 11* | *I can show and demonstrate my understanding of perimeter of regular and irregular shapes and finding the area of polygons.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.*  *- model mathematics in contextualized experiences* | | | **Perimeter and Area test**  **See what students understand about the different kinds of perimeter and area that was covered.**  **Students are not being assessed on memorizing the formulas which is why a formula will be given on the test. Instead, students are being assessed on if they understand what perimeter and area are and how to calculate the different perimeters and areas using the formulas given.**  **\*Summative assessment- seeing student understanding of perimeter of complex shapes and finding the area of rectangles, triangles, parallelograms, and trapezoids.** | | | |
| *Lesson 12* | *I can explain what pi is and how it is used.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.* | | | **Introduction to circles; vocabulary associated with circles (circumference, radius, diameter, and π)**  **What is π? The circumference divided by the diameter will always equal π (demonstrate this as a whole class by drawing a circle on the board and tracing string around the edge—cut the string in equal pieces (should get 3 equal pieces with a small remainder 0.14…)**  **Discuss why you would need to know the circumference of something (i.e., measuring brain growth in babies, railing around a skyscraper, RPM)**  **\*formative- classroom observations, discussions, and questions from the students.** | | | |
| *Lesson 13* | *I can find the circumference of a circle.*  *Curricular Competencies:*  *-model mathematics in contextualized experiences.* | | | **Find a circular object in the classroom (water bottle, CD, magnet, cap, etc.)**  **Back at your desk with this object, determine the diameter and the radius (done by measuring across the item with a ruler)**  **After your diameter and radius has been determined, calculate the circumference. (πd or 2πr)**  **Once everyone in the class has determined the circumference, order yourselves from greatest to least across the classroom.**  **\*formative- using what students already know (ordering numbers) and applying it to a new topic (circumference) and continued practice of the new topic.** | | | |
| *Lesson 14* | *I can continue to practice finding the circumference of a circle using both radius and diameter measurements.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.* | | | **Practice with circumference 🡪 calculating with both radius and diameter. Provide examples for students to work on with using a piece of paper or a white board. Within these examples, the teacher will provide both diameter and radius measurements to show students both ways of calculating the circumference.**  **After students are comfortable with the examples, they can have more practice using the sheet provided.**  **\*formative- teacher will collect sheets to determine where students are at with circumference (if more practice is needed, add more lessons below before continuing to area)** | | | |
| *Lesson 15* | *I can calculate the area of a circle.*  *Curricular Competencies:*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.* | | | **Introduction to area of a circle (πr2) 🡪 talk about what the squared piece means (r x r not 2 x r)**  **Like how students worked through the other area problems, circles are another formula to use.**  **Find something circular in the classroom and calculate the area of it by measuring the radius.**  **Students must find 3 different objects in the classroom, calculate their areas, and record them on the sheet. After students will order them and calculate the circumference for practice. At the top of the sheet, ask students to self-assess using the 1-4 numbers.**  **\*formative- students self-assess and hand back their sheets so teacher and see where students are at and to determine if more practice is needed** | | | |
| *Lesson 16* | *I can find the circumference of a circle.*  *I can find the area of a circle.*  *Curricular Competencies:*  *- develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.*  *-model mathematics in contextualized experiences.* | | | **Review practice with circumference and finding the area of a circle.**  **Students will have the choice between a review package (made almost identical to the test) or working on math games/prodigy.**  **\*formative- final check in with those students who may be struggling or need further clarification on one area.** | | | |
| *Lesson 17* | *I can calculate the circumference of a circle.*  *I can calculate the area of a circle.*  *Curricular Competencies:*  *-model mathematics in contextualized experiences.*  *-develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving.*  *-connect mathematical concepts to each other and to other areas and personal interests.* | | | **Circumference and Area of a Circle test.**  **Students are expected to calculate the circumference and find the area of a circle. Formulas will be given due to being assessed on calculating the circumference and area rather than memorizing the formula.**  **\*Summative- seeing students understand how to calculate the circumference of a circle and calculate the area of a circle using the formulas given.** | | | |
|  | **Resources needed:** | | | | | | |
|  | **- Whiteboards**  **- Grid paper**  **- Colour tiles**  **- Formula sheet**  **- Variety of practice worksheets for students to build understanding** | | | | | | |
|  | **Interdisciplinary connections:**  (e.g. How did you weave ELA, Social Studies, Science, Math, Fine Arts, and/or ADST together in this instructional sequence?) | | | | | | |
|  | **ADST; students can build while problem solving with their own shapes using math manipulatives to help understand perimeter of irregular shapes.** | | | | | | |
|  | **Reflection** | | | | | | |
|  | **How did the unit go? How do I know?**  **\* Reflect with CT** | | | | | | |
|  | **Where to next?**  **After the completion of perimeter and area, move into the introduction to decimals** | | | | | | |