



The BIG Mathematical Idea(s)

The students will UNDERSTAND



We can describe, measure, and compare spatial relationships: Polygons are closed shapes with similar attributes.

We use patterns to represent identified regularities and to form generalizations: The regular change in patterns can be represented using tools and tables.

Inquiry Question:

Pick a pattern block shape. Using only that shape, is it possible to fill a tile floor with this shape?

Curricular Competencies

The students will BE ABLE TO:

Reasoning and analyzing

- Use reasoning and logic to explore and make connections

Understanding and solving

- Use multiple strategies to engage in problem solving (e.g., visual, oral, role-play, experimental, written, symbolic)
- Develop, construct, and apply mathematical understanding through role-play, inquiry, and problem solving
- Engage in problem-solving experiences that are connected to place, story, and cultural practices relevant to the local community

Communicating and representing

- Communicate in many ways (concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, and apply mathematical ideas)

Mathematical Concepts

The students will KNOW:

Grade Four

- increasing and decreasing patterns, using tables and charts
- algebraic relationships among quantities
- regular and irregular polygons
- line symmetry

- Describe, create, and interpret relationships through concrete, pictorial, and symbolic representations
- Use technology appropriately to explore mathematics, solve problems, record, communicate, and represent thinking

Connecting and reflecting

- Visualize and describe mathematical concepts
- Connect mathematical concepts to each other and make mathematical connections to the real world (e.g., in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration)
- Share and reflect upon mathematical thinking
- Draw upon local First Peoples knowledge and/or expertise of local Elders to make connections to mathematical topics and concepts

Description of Learning Activity

Every student should be able to show and communicate their understanding of the concepts, and be allowed to represent their understanding through concrete materials, pictures, numbers or words. Providing the opportunities for students to show what they know in a way that makes sense to them is a critical component. Ensure that the manipulatives and ‘thinking tools’ are accessible. Consider some guiding questions you might ask to scaffold or extend thinking.

Before

- Take the class on a tour of the hallway or a classroom that has tile flooring. Ask the students to look at the floor design and describe what they notice. Record their answers on chart paper.

During

- The teacher will read aloud the Inquiry Question and ask student to discuss how they might approach this question. The teacher will ask students to choose whether to work individually, in pairs, or small groups to solve the question. Each student/pair/group will be provided with a typed copy of the question on a large 11 x 17 piece of paper.
- The teacher will make concrete materials – the pattern blocks available to the students – as well as paper, pencils, markers, and/or iPads. Students may choose to use a free iPad app called Pattern Shapes to explore the question.
- The teacher will circulate, assist students, and ask prompting questions so as to nudge their learning forward.

After

- Students will gather together as a class. Teacher will ask the students to share the various ways they responded to the question. This will include:

- Describing the process
- Explaining the strategies used
- Justifying choices and answers
- Showing how they represented their understanding? (E.g., concretely, pictorially, symbolically)

First People’s Principles of Learning – Learning involves patience and time. Revisiting concepts multiple times, providing learners with opportunities to deepen their knowledge by layering and understanding.

Adaptations:

Encourage students to begin to explore with a shape they are familiar with (E.g. a square).

Extensions:

Ask students to explore what tiling creations they could design using all of the pattern blocks? As the students to compare the process of using a single shape and the process of using multiple shapes.

Assessment – Demonstrating Understanding of Content Through the Curricular Competencies

Curricular Competencies:

The students will develop the following curricular competencies to become Mathematical thinkers and problem solvers by:

Reasoning and analyzing

- Use reasoning and logic to explore and make connections

Understanding and solving

- Use multiple strategies to engage in problem solving (e.g., visual, oral, role-play, experimental, written, symbolic)
- Develop, construct, and apply mathematical understanding through role-play, inquiry, and problem solving
- Engage in problem-solving experiences that are

Guiding Questions:

Teacher will circulate and record anecdotal comments. Choose one or more of the following to assess depending on the context of your class.

Reasoning and analyzing

- Would you be able to use the pattern block you chose to tile a floor? Explain your reasoning.

Understanding and solving

- What strategies did you use to create your design?
- Describe and compare the strategies you used to represent your design.
- When you think about floor tiling designs you have seen in the world, what strategies do you think the artist/tiler used?

connected to place, story, and cultural practices relevant to the local community

Communicating and representing

- Communicate in many ways (concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, and apply mathematical ideas)
- Describe, create, and interpret relationships through concrete, pictorial, and symbolic representations
- Use technology appropriately to explore mathematics, solve problems, record, communicate, and represent thinking

Connecting and reflecting

- Visualize and describe mathematical concepts
- Connect mathematical concepts to each other and make mathematical connections to the real world (e.g., in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration)
- Share and reflect upon mathematical thinking
- Draw upon local First Peoples knowledge and/or expertise of local Elders to make connections to mathematical topics and concepts

Communicating and representing

- How would you describe your design?
- Explain how you represented your thinking.
- How would you interpret relationships through various representations?
- Explain how you used technology to communicate and represent your thinking.

Connecting and reflecting

- Explain how you visualized and proved that the shape you chose either worked or did not work in a floor tile design. How did visualizing help you?
- What connections did you make?
- Reflect and identify the relationships represented.