THOMPSON RIVERS UNIVERSITY | Education & Social Work

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

Lesson Plan

Lesson Title: Proportional Reasoning Lesson # 1 Date: February, 29th 2021

Name: Julia Sonnleitner Subject: Math Grade(s): 9

Rationale:

This lesson is elaborating on the big idea that similar shapes have proportional relationships that can be described, measured, and compared. Learning how special proportions relate to each other might seem abstract to students, but they will quickly learn it is a concept they have already readily applied in their own lives. This lesson will also be done by focusing on the FPPL that learning recognizes the role of indigenous knowledge and that learning requires the exploration of one's own identity. By examining indigenous artist can use proportional reasoning to scale their work, students will complete an activity where they learn to do the same.

Core Competencies:

Communication	Thinking	Personal & Social
Students express and reflect on a variety of experiences, perspectives, and worldviews through place. This is foundational to First Peoples perspectives. Students recognize how combining others' perspectives, strategies, and efforts with their own enhances collective understanding, use, and impact.	Students use critical and reflective to examine their own thinking and that of others. They are asked to generate creative ideas through free play, engagement with other's ideas, or consideration of a problem or constraint, and/or because of their interests and passions.	Students develop a positive personal and cultural identity by valuing their personal and cultural narratives. They are able to understand how these shape their identity and connect it with their own well-being and to the well-being of their family, community, and society.

Big Ideas (Understand)

Math 9 - similar shapes have proportional relationships that can be described, measured, and compared
Arts Education 9 - The arts provide opportunities to gain insight into the perspectives and experiences of people from a variety of times, places, and cultures.

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies	Learning Standards - Content
• Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information • Use mathematical vocabulary and language to contribute to mathematical discussions • Communicate mathematical thinking in many ways • Formulate physical or mental theoretical models to describe a phenomenon • Seek and analyze patterns, trends, and connections in data, including describing relationships between variables (dependent and independent) and identifying inconsistencies • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts	<u>spatial proportional reasoning</u> • scale diagrams • drawing a diagram to scale that represents an enlargement or reduction of a given 2D shape • integration of scale for First Peoples mural work, use of traditional design in current First Peoples fashion design, use of similar triangles to create longhouses/models

• Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving	

Instructional Objectives & Assessment

Instructional Objectives (students will be able to…)	Assessment
• Build and analyse circuits • Understand how the simple circuits they assemble are similar to the circuits the interact with on a daily basis (eg. house lights)	• Worksheet (product) • Project (product/communication) • Kahoot game

Prerequisite Concepts and Skills:

- Students already should be familiar with basic algebraic functions using multiplication and division

Indigenous Connections/ First Peoples Principles of Learning:

Learning requires the exploration of one's own identity – First people's perspective that the connection between people own identity and learning is foundational. In this lesson, students will be given the opportunity to choose which Haida art symbol best represents their characteristics. Students will have to read a short summary of what these animal symbols represent in Haida learning. In their project they will have the option of either orally describing this connection or using writing it out.

Learning recognizes the role of Indigenous knowledge – The knowledge of first people has not always been acknowledged and is still often put aside to focus on post-industrial Euro-centric cultures.
Students will consider other ways of knowing from an Indigenous science perspective.

The videos will be used to show examples of the hand drums and also how artist can scale art.

https://www.youtube.com/watch?v=nkrwFnPzOf0&feature=emb_imp_woyt
https://www.youtube.com/watch?v=n2arqHS1DOc&feature=emb_imp_woyt

Universal Design for Learning (UDL):

Students will be provided with means of engagement, representation, action and expression.

This lesson plan supports learners with multiple intelligences:
Interpersonal – Reflecting on their own identity
Existential – Students will be given opportunities to relate big ideas in math their own experiences
Visual Spatial – A large artistic component of this lesson will support visual learners
Interpersonal – Students will be provided with indigenous cultural views and believes.
Verbal-Linguistic – Students will be given a short lecture on some key terms and concepts. They will also have some reading and writing assigned.
Logical Mathematical – This will have used generalized mathematic principles to solve real word problems.
Body Kinetic – To choose the animal they identify with students will need to move around the classroom

This lesson will support indigenous learners by including an indigenous connections/ first people's principles of learning, being aware of indigenous learning styles and connecting physics with community.

Differentiate Instruction (DI):

There are some students with UDL's I will support these students by giving them filled in notes and frequently checking in on them.

Materials and Resources

Printed worksheets, projector, tablet, coloring pencils and rulers

Lesson Activities:

Teacher Activities	Student Activities	Time
Introduction (anticipatory set – "HOOK"): I will introduce myself the class as I have not had the opportunity to do so yet. The class begins with a short fun video introducing the topic of proportional reasoning. The videos humorously demonstrate proportional reasoning via a guy guessing people's heights.	Listen/watch video then be asked to guess what our topic is for the day.	10 min
Body: We will start by going over reading about Haida hand drums and I will briefly talk about the project they will be doing. I will then give a short presentation on proportional reasoning. Students will be given a worksheet to work on as homework to practice the skills they just learned. As they are working I will show them a video of a musician playing the Haida drum. As students are working I will check on any EIP students and see how they are feeling about the material After 10 minutes I will stop them to go into more depth on their project. They will be asked to choose an Haida symbol that best represents them. They will need to justify this either orally of in writing.	Students will be handed out partially completed notes ahead of time and can fill them in as we go over the mathematical terminology in proportional reasoning. Students will be given 10 minutes to work on a homework worksheet.	40 min
Closure: At the end of the class we will play a quick game of Kahoot.		10 min

Organizational Strategies:

I have many handouts to give them. So, as I am greeting them at the door I will be giving them all the papers they will need at once. I will have time before the lesson starts to set up the location of the print outs.

Proactive, Positive Classroom Learning Environment Strategies:

As students are coming into the class I will great them at the door.

Extensions:

The extension to this lesson is the multiple world view students are exposed to by learning about the Indigenous Science. Students are asked to challenge their precious perspective of math and how it can relate be related to a sense of self. This lesson utilized two FPPL: learning recognizes the role of indigenous knowledge and that learning requires the exploration of one's own identity After this lesson student will learn about forces in power and efficiency.

Reflections (if necessary, continue on separate sheet):

Teacher will place reflections based on observations, things that went good/change for next time after the lab has occurred.

References

https://www.youtube.com/watch?v=nkrwFnPzOf0&feature=emb_imp_woyt
https://www.youtube.com/watch?v=n2arqHS1DOc&feature=emb_imp_woyt
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