Lesson Plan:
Furious Fraction Forts - Grade 5
Patrick McDowall

Established Goals (Big Ideas):

- Numbers describe quantities that can be represented by equivalent fractions.

Rationale

Through an understanding of fractions and equivalent fractions, learners will be able to create whole numbers in a fluent and fun manner.

Essential Questions

- What is an equivalent fraction?
- How can fractions be added together to make a whole number?

Students will be able to: *(Competencies)*	**Students will know:** *(Content)*
- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving. - 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	- Whole-number, fraction, and decimal benchmarks. - Equivalent fractions.

Learning Intentions

Students will explore the concept of equivalent fractions. Using this gained knowledge, they will create whole numbers through an understanding of equivalent fractions. This practise will take the form of a game that incorporates First Nation histories.

Prerequisite Concepts and Skill:
- A basic understanding of fractions and how they can be added to make whole numbers.
- A good grasp of addition and multiplication.

Materials and Resources with References/Sources (per group):

1. Teachers can access information about Haida warfare techniques and defensive strategies from the website of the Canadian Museum of History. This website will provide enough basic information for the teacher to create an accurate scenario for the attack. **http://www.historymuseum.ca/cmc/exhibitions/aborig/haida/havwa01e.shtml**
2. A box of cut out fractions for each group. These must be numerous and range in level of challenge. Teachers can also create different boxes that are more or less challenging depending on the level of the different student groups.
3. One map of a village layout for each group.
4. One large image of the approaching Haida war canoe that the teacher will move towards the villages.
5. Cut outs of fortifications that students can place around their villages.
6. Additional prizes like armour and weapons.

Differentiated Instruction (DI):
- The entire activity is differentiated for multiple intelligences. Different parts of the activity will involve elements of logical-mathematical, kinesthetic, visual, and interpersonal intelligences.
- The activity has the potential to keep all learners engaged as there are numerous problems from basic to extending levels.

Activity Description

Intro

- Summarize fractions and ensure students are familiar with numerator and denominator.
- A basic introduction to equivalent fractions will be given to learners through lecture format. The teacher will utilize imagery to explain how fractions can be expressed in varying equivalencies. Using the imagery of a pie, the teacher will divide it into one half. That half will then be divided into two quarters and through visualization, learners will see that the one half and two quarters are equivalent. Several more examples will be provided.
- Once learners can visually understand the notion of equivalency, the teacher will then show how multiplication can be applied to equivalency.

Game Layout:

- The game needs a good open space of about 10m x 10m so as to ensure students have room to move.
- Place each of the Tsimshian village maps close together in a line with enough space for the student groups to stand behind.
- Place the image of the Haida war canoe approximately five meters away from the line of villages.
- Place a bag of cut-out fractions beside each of the villages. When the game begins, students will use these to make whole numbers.

- At the teacher's table beyond the Haida war canoe, place bags of printed fortifications and weapons that will be awarded for each completed whole number. The learners will bring each completed whole number to the table for inspection.

Body

- The equivalent fraction activity begins. Learners will be partnered into groups and each group will be assigned a map of their Tsimshian village along the BC coast.
- Atmosphere can now be created by playing a recording of drumming in the classroom. Describe to the learners how they are peacefully going about their existence when word reaches them that Haida war canoes are approaching. Explain that to protect themselves from being enslaved or killed, they must erect walls to defend their village from the aggressors.
- Their challenge will be to build fortifications around the whole village before the Haida warriors arrive. Only if the village is completely fortified will their people be safe.
- Each group will then be given a small box containing pieces of paper with different proper fractions on them. These proper fractions will range from simple 1/2 to more complex 15/20. There will also the possibility for improper and mixed fractions to be included so that extending students can challenge themselves.
- Once each group receives their box of fractions they will be told that they must form whole numbers with the fractions.
- The game begins with drumming and possibly a timer projected on the whiteboard. After making a whole number, each group must then bring it to the teacher who will check it and if it is correct, they will be rewarded with a piece of fortification. The more whole numbers the learners form from the fractions, the safer their village will become.
- Learners will also be told that the Haida war canoes are moving towards the villages at a set rate. Every minute the canoes will move closer to the villages.
- If the canoe is 5 meters away from the villages, then the teacher will move the canoe forward 50cm every minute. This will give the students 10 minutes to try and fortify their village.
- As the canoe comes closer to the villages, the teacher can use their own discretion to direct the canoe towards those villages with the fewest fortifications.
- The number of fortifications needed to enclose their village depends on the print size of the map. Aim for ten or so fortification pieces, meaning that the learners will have to complete ten problems in ten minutes. This number can be changed depending on the ability of students.
- The difficulty of the problems can also be mediated. Advanced groups can be given more challenging fractions while those still getting comfortable with fractions can have more simple fractions.
- An additional challenge could include the requirement that students must run a certain distance so as to express the physical requirements of building the fortifications. Once they have run the distance, they return to their village, lay down the fortifications, and then begin working to create a new whole number with the fractions.
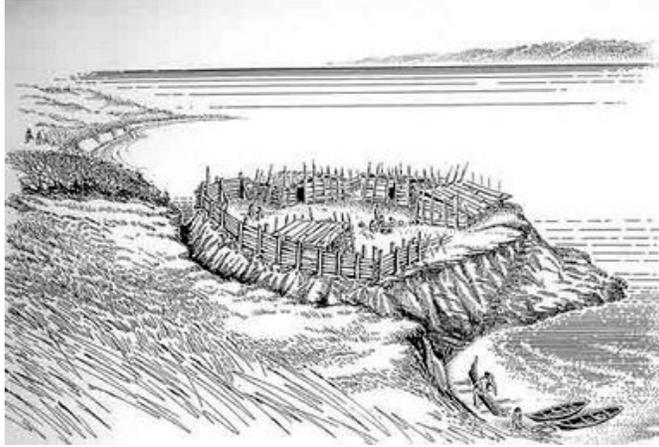
Procedure

1. Students learn about equivalent fractions and how they are related to proper fractions and the creation of whole numbers.
2. Students partnered into groups.

3. Village activity begins with students building whole numbers with fractions from their assigned boxes. After each solution they receive a piece of fortification.
4. Students have to fully enclose their village before Haida war canoes arrive to be successful.

Assessment

- This activity requires a formative assessment strategy where the teacher visibly notes each students success in their understanding of equivalent fractions and addition of fractions.
- The ability to completely fortify their villages will express the students success in understanding equivalent fractions.
- Teacher should have notebook ready to write down the abilities of each student in completing the activity.

Materials Needed

1. Find image to represent Haida War canoe.
   https://www.historymuseum.ca/cmc/exhibitions/aborig/nwca/nwcam24e.shtml

2. This is the village map each group will receive. The fortifications must go around the whole village. Depending on the size of the printing, aim to have around eight separate fortifications.

3. Example of fortifications and fortification walls to print.

Print below image for wall:

4. Armour and weapons (can print as give out as bonuses once walls are complete).

1/2 2/4 3/6 4/8 5/10

1/4 2/8 3/12 4/16 5/20

3/4 6/8 9/12 12/16 15/20

1/3 2/6 3/9 4/12 5/15

1/5 2/10 3/15 4/20 5/25

(Can also include odd improper fractions that cannot be used)

11/13 7/39 71/93 23/27