|  | Part 1-Logistics |
| :--- | :--- |
| Unit Title: The Power of Fractions in Careers | Instructional Designer(s): Lorie Penner |
| Problem/Issue/Theme: In grade 7, fractions are a foundational concept <br> in the math curriculum. If students do not master fractions, this can lead <br> to further difficulties in grasping higher math concepts. We know that <br> fractions are both an important part of the middle school math <br> curriculum and fractions are a workplace skill in most careers. Let's <br> change our attitudes towards fractions by mastering the operations of <br> fractions through career challenges. Students will choose a career and <br> apply their knowledge as part of a Career Day. Our Math Career Day will <br> showcase our student's math skills and offer new knowledge and insight <br> about careers. | fractions now and in the future? |
| Curriculum Areas/Topics: Math/Number/Developing Number Sense | Grade: 7 |
| Rationale: Students will develop a number sense of fractions through <br> solving the twelve career challenges in pairs. Once the students have <br> solved the twelve career challenges in pairs, the students will work <br> individually to research and create a fraction challenge using the career to use <br> of their choice. For ideas and support, we will have a guest speaker <br> come in at the beginning of selected classes to discuss how fractions are | Duration: This project will be a total of 20 days, from October 10th to <br> November 7th, 2017. We determined this time frame based on the 2017-18 <br> Red Deer Public School calendar. <br> Link to Math Year Plan <br> Red Deer Public School Division 2017-18 Calendar <br> Numbers is one of the large units, so it should be introduced after the |

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a part of their specific career. The grade 7 students will have an opportunity to showcase their Math Career Day with the grade 8 \& 9 students. By linking this math outcome to careers, students will gain a real life experience through creating career related scenarios and presenting their findings to the grade $8 \& 9$ classes. It will be exciting for the students to pick a career and possibly collaborate with a person who has experience in their chosen career and present their ideas to grades 8 \& 9. By encouraging students to work both collaboratively and independently, students will be given the opportunity to be creative, yet will have a partner, Career Guest Speakers, and a teacher to consult with. Link to Career Challenges \& Solutions
List of Careers That Require Fractions as a Job Skill
By scheduling a Math Career Day as the cumulative project in this unit, we believe that the students will embrace the challenge to work through this outcome. The numbers unit has a total of 7 outcomes; therefore, we will have an appropriate number of teaching days dedicated to the other five outcomes.
Alberta Education - POS Grade 7 Math
students' initial math assessment at the beginning of the year. The complete numbers unit would work well from September 25 to November 24 because it is one of the largest units and it would require a period of time where full weeks are available rather than being broken up by large holidays. We also believe that offering a UBD project in this unit will give students a way to apply and practice their learning in this important unit in the grade 7 math curriculum.
For this UBD project, we are focusing on outcome \#5 out of a total of 7 outcomes for the numbers unit for grade 7. The first 4 outcomes are: determining number divisibility, demonstrating basic operations of decimals and understanding the relationship between positive terminating/repeating decimals and fractions, and solving problems involving percents.
POS Outcome \#5: Demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially and symbolically (limited to positive sums and differences).
For outcome \#5, we would spend the first week teaching students the basic understanding of the addition and subtraction of fractions. Next, we would apply the knowledge of fractions to job related skills in careers that require fractions. By using careers as a way to apply fractions, students will learn to demonstrate fractions concretely, pictorially and symbolically.

## Part 2 - Desired Results

Learning Outcomes: (Literacy, Numeracy, subject areas)
5. Demonstrate an understanding of adding and subtracting positive
fractions and mixed numbers, with like and unlike denominators,
concretely, pictorially and symbolically (limited to positive sums and
differences). [C, CN, ME, PS, R, V]

## Cross-curricular competencies:

## Links to the Skills and Process Social Studies Curriculum

7.S. 4 demonstrate skills of decision making and problem solving:

- predict outcomes of decision-making and problem-solving scenarios from multiple perspectives
- propose and apply new ideas and strategies, supported with facts and reasons, to contribute to problem solving and decision making
- articulate clearly a plan of action to use technology to solve a problem
- identify appropriate materials and tools to use in order to accomplish a plan of action
- use networks to brainstorm, plan and share ideas with group members
- evaluate choices and progress in problem solving, then redefine the plan of action as necessary


## Skills:

What should students be able to do? What behaviors will they exhibit?

## Students will be able to...

- Determine the sum of two or more given positive fractions or mixed numbers with like denominators.
- Determine the difference of two or more given positive fractions or mixed numbers with like denominators.
- Determine a common denominator for a given set of positive

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- Finding a common denominator and adding positive fractions with unlike denominators.
- Finding a common denominator and subtracting positive fractions with unlike denominators.
- Subtracting of two or more positive mixed numbers with unlike denominators.
- Adding of given positive fractions or given mixed numbers, using concrete representations, and record symbolically.
- Subtracting of a given positive fractions or given mixed numbers, using concrete representations, and record symbolically.
- Create and and solve word problems involving the addition and/or subtraction of fractions.
- Estimate if a solution to an addition and /or subtraction problem is reasonable.

Link to Student Math Ninja "I Can" Statements
fractions or mixed numbers.

- Determine the sum of two or more given positive fractions or mixed numbers with unlike denominators.
- Determine the difference of two or more given positive fractions or mixed numbers with unlike denominators.
- Simplify given positive fractions or mixed numbers by identifying the common factor between the denominators.
- Simplify the solution to a given problem involving the sum or difference of two or more positive fractions or mixed numbers.
- Solve a given problem involving the addition or subtraction of positive fractions or mixed numbers, and determine if the solution is reasonable.
- Demonstrate the addition or subtraction of two or more given positive or negative fractions or mixed numbers with like or unlike denominators concretely, pictorially or symbolically.


## Part 3 - Assessment Evidence

## Performance Task /Culminating Activity

What authentic, relevant task will allow students to show what they've learned during the unit? In the space below, include all elements of GRASPS, including success criteria (based on learner outcomes). At the bottom of this section, describe the scenario or situation (in paragraph form) that will require students to apply their knowledge and skills to demonstrate their learning in a real-life situation. Attach your performance task rubric to your unit plan.

G - Goal : To help students create a more positive mental framework surrounding math - fractions specifically - by showing them how they will use fractions as a job skill for various careers that they may choose.

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R-Role : The students will design a project showing how they will use fractions in the career which they have picked.

A - Audience: This project will be showcased to the grade $8 \& 9$ students because these grades are engaged in career studies.

S - Situation: Students will determine the different uses of fractions in a variety of workplaces.

P - Product, Performance: Each student will create a presentation that models their chosen career through a fraction based problem, and a solution to the question. Students will choose a product that they will use to demonstrate their knowledge. This student product can be a poster, slideshow, brochure, diorama, journal, Illustrated drawing, etc.
 the problem.

1) Make a connection to prior knowledge-Students will make a connection to their prior knowledge of how to add and subtract
2) Understands the challenge-The students will understand the challenge question that they are given
3) Choose a strategy- Students will be able to determine the most efficient way to solve the questions
4) Proposes a solution in response to a challenge- Students will be able to solve the questions correctly using their strategies.
5) Connects to real life situations- The students will be able to connect the career questions to real life situations.

## GRASPS performance task:

Students will work through all twelve of the career challenges that we have created. Once students have completed each challenge, they will add them to their career folders. Students will have three classes to complete the twelve career challenges. Once the students have completed all twelve careers, they will pick a career that they would like to use to create their own career challenge. At the end of the seventeen days, students will showcase their career challenges at our grade seven Math Career Day. The grade seven students will choose how they want to present their career challenges. This product can be demonstrated by a poster, brochure, journal, etc. Each product will include the career choice, the fractional question, and how they solved the question. The grade eight and nine students will be invited to the Math Career Day, and the grade seven students will walk them through their career folders and their projects.

## Other Evidence:

How will you gather evidence of learning through the unit? List your formative, summative and student self-assessment ideas. These may include work samples, observations, quizzes, tests, journals or other means for students to demonstrate achievement of outcomes.

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Formative Assessment: While students are completing the twelve career challenges, the teacher will circulate the room and check for understanding. After each class, students will submit their career folders for review and comments. The teacher provide feedback \& areas that require additional "ninja" work (refer to the "I can" statements). During the creation of their projects, teachers will conference with each student and provide feedback on the following: chosen career and how each student demonstrated problem using fractions that reflects a job skill for their chosen career.
Summative Assessment: The career folders will be marked to make sure each student has completed all twelve of the career challenges. A mark will be given based on the amount of work shown and the answer. At the end of the Math Career Day the students will hand in their projects, the teacher will give a mark based on the student grading rubric. The self reflection done by the students will also be added to the mark of the project. Students will be formatively assessed by a unit test at the end of the unit.
Self-Assessment: During the career project, each student will be given a checklist and a self-reflection to fill out. Through the self-reflection, students will be asked to write two paragraphs on what they learned through the project and what they would do different next time. Students will have an opportunity to conference with the teacher after they write their self-reflection. This self reflection will also be applied to the final grade.

## Part 4 - Learning Plan

What teaching and learning experiences will you use to achieve the learning outcomes in Part 2 and prepare them for the assessment tasks in Part 3? What will the sequence of instruction be for this unit? In the space below, indicate how you will grab student attention through an introductory activity (anticipatory set for the unit).

## Introductory Activity/Entry Event:

For the entry event, we would introduce the concept of fractions by considering how we would use fractions for a job skill in a career. Next, we would provide a description of the project and provide an exemplar of the culminating project to encourage students to relate prior knowledge and determine what type of evidence they may need for their culminating project.
In addition, we will display twelve posters of careers around the room that demonstrate the career challenges that the students will be solving. These posters will provide an example of how students will use fractions as job skills.
We also supplied a mystery box of measurement tools that relate to fractions. After, we would introduce the careers, we would use the mystery box of measurement tools as a guessing game to relate the tools to the careers, such as measuring cups, tape measures, and coins.
On the first day of introducing the unit, we would set up a photo booth with career apparel and props to initiate students thoughts around different

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careers. As part of the entry event, we will invite a guest speaker to talk about how the students will use fractions in their career. The students will be informed that there will be two more guest speakers throughout this unit.
Differentiated Instruction Strategies: For the 12 career challenges, we built a variety of levels of challenges into the questions. For example, an entry level career, such as a travel agent would offer an easier question to solve (it involves only division); whereas a career that requires a higher level of education would have a harder challenge. For the culminating project, we would modify the project to accommodate the student needs. For example, students would choose a career, write the description of the career, and the fractional questions would be provided for them. The student would then find the solutions and display their final project in a way that is decided by the student and the teacher.

| Lesson <br> \# | Learning Outcome <br> (Curriculum) | Learning Activities <br> (Instruction) <br> (Include instructional strategy + what students will be <br> doing) | Assessment <br> (FOR/OF/AS) | Resources / Materials <br> (equipment, textbooks, technology, <br> multimedia, etc.) |
| :--- | :--- | :--- | :--- | :--- |
| $\mathbf{1 .}$Oct. 10 | Entry Event <br> Model addition and <br> subtraction of a given <br> positive fraction or given <br> mixed number, using <br> concrete representations, <br> and record symbolically. | At the beginning of the class, students will view the <br> twelve career descriptions that are posted around the <br> classroom. <br> Using the mystery box, students will guess what <br> careers use the measuring tools that relate to <br> fractions. <br> Students will explore careers by dress up and take a <br> pictures in a photo booth. <br> The teachers will explain to the students that for the <br> next two weeks we will be focusing on creating and <br> solving challenges that involve fractions are realistic | Formative | • Posters of careers <br> - Videos of a few different <br> careers doing math |

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|  |  | job skills for various careers. <br> The students will be shown a landscaping/gardening exemplar of the type of project that they will be completing at the end of the unit. <br> A guest speaker will discuss how he/she uses math and fractions everyday. The students will have an opportunity to ask the guest speaker questions about how they use fractions in their career. |  | Rubric <br> - List of Careers That Involve Fractions <br> - Guest speaker (either in person or by Skype) |
| :---: | :---: | :---: | :---: | :---: |
| 2. Oct. 11 | 5. Demonstrate an understanding of adding positive fractions with common denominators [ $C$, CN, ME, PS, R, V] | Students will create a foldable file for their notes <br> - Students can use foldables as a reference throughout the unit and as a study resource for the unit test. <br> Students will watch the video that explains how to add fractions. The teacher will model adding fraction and ask for help from the students. <br> - As a class we will work through a few examples, and the students will record the steps in their foldable. <br> Students will work through the worksheet <br> - The teacher circulate the room and check in with the students to make sure that they are understanding the learning concept. <br> - Before the end of class, the teacher will show the students the answers to the first few questions so that the students can make sure | Formative | - Video on adding fractions https://www.youtube.co $\mathrm{m} /$ watch? $\mathrm{v}=5$ juto2ze8Lg <br> - https://www.youtube.com <br> /watch? $\mathrm{v}=1$ thX9Qml0Ks <br> (3:20-8:22) <br> - Foldable <br> - Adding fractions worksheet |

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|  |  | they are on the right track. |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 3. <br> Oct. 12 | 5. Demonstrate an understanding of adding positive fractions with uncommon denominators [C, CN, ME, PS, R, V] | Teacher will model the addition of fractions with uncommon denominators. <br> - As a class, we will practice multiple examples on the board. <br> - Students will add the steps of adding fractions with unlike denominators to their foldable. <br> Students will get into pairs and will play the fractions bump game. <br> - Teacher will walk around the room and monitor the student progress. If students are struggling with adding fractions, they can be moved into a group where peers can help one another. | Formative Assessment | - Fruit Fractions video $(0: 00-1: 22)$ <br> Fractions Bump Game <br> - Adding fractions with uncommon denominators worksheet. (For extra practice if students wish) |
| 4. <br> Oct. 13 | Check-in <br> 5. Demonstrate an understanding of adding positive fractions with uncommon denominators [C, CN, ME, PS, R, V] | Students will complete a Google form quiz. Following the quiz, students will be able to play math related games. If any students struggled with the quiz, the teacher will be able to work with them one on one at this time. | Summative | - Google quiz <br> - Variety of math related games. |
| 5. <br> Oct. 16 | 5. Demonstrate an understanding of subtracting positive fractions with common denominators [C, CN, ME, PS, R, V] | Students will watch the fractions video. <br> Teacher will model how to subtract fractions <br> - Go over slides 5-6 on the powerpoint <br> - On slide 10 students can work through the six questions | Formative | - Video for subtracting fractions <br> - Powerpoint for subtracting fractions (slides 5-6 and 10) <br> - Domino fractions |

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|  | Students will use dominoes to practice fractions <br> Each student will be given one domino <br> They will need to go around the room and find <br> someone that has the same denominator. <br> 0 <br> Together they will work through the <br> problem <br> Once they have an answer they will <br> raise their hand and check with the <br> teacher if they are correct |  |  |
| :--- | :--- | :--- | :--- | :--- |

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| 6. Oct. 17 | 5. Demonstrate an understanding of subtracting positive fractions with uncommon denominators [C, CN, ME, PS, R, V] | Today, when students come into class they will see a question on the board that they will solve. <br> - Find the fractions game: How many students are wearing a pink shirt, blue shirt, or green shirt <br> - Now add them together <br> - Now subtract them <br> Students will watch the video of how to subtract fractions with unlike denominators. <br> - Students are encouraged to have their foldable out and take notes, as well as work through the problems in the video <br> - The video will be paused so students can try the examples <br> Fractions with dominos <br> - Each student will be given six dominoes <br> - They will find a partner and play a game of war <br> - Whoever subtracts the fraction correctly first gets the dominos <br> - Students can have paper and pencils to help them workout the equations <br> - Once one partner has lost all dominoes, the students will split up the dominoes equally and each find a new partner. | Formative | - Dominoes war game <br> - Fruit fractions (1:22 for subtraction) |
| :---: | :---: | :---: | :---: | :---: |

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| 7. <br> Oct. 18 | 5. Demonstrate an understanding of adding mixed numbers | Students will complete a google form quiz on subtraction of fractions. <br> After the quiz, the teacher will model how to add mixed numbers. The students will be given a worksheet on adding mixed numbers. After the students are working, the teacher will review the results from the quiz and will work with the students who need additional help. | Summative/for mative | - Adding mixed numbers video <br> - Google form quiz <br> - Adding mixed numbers worksheet |
| :---: | :---: | :---: | :---: | :---: |
| 8. Oct. 19 | 5. Demonstrate an understanding of subtracting mixed numbers | Teacher will go over the mixed numbers slideshow <br> - Students will use their foldable to copy notes <br> - Teacher will pause the video to give students time to work through the examples. <br> Students can go onto www.mathgames.com and practice subtracting mixed numbers | Formative | - Video <br> https://www.youtube.com/watch?v =WF7L2waDwLw <br> - Slideshow(Premade) <br> - https://www.slides hare.net/bayoung/s ubtract-mixed-num bers-presentation |
| 9 <br> Oct 20 | Gameday \& practice quiz | Students will complete the Student Math Ninja "I Can" Statements to review all the "I can" statements. Students will use the card game to add and subtract positive fractions and mixed numbers. They may work in pairs or work independently. <br> Mixed fractions quiz. The teacher will review the results from the quiz and will offer additional help where needed. | Summative/ Formative | - Student "I Can" Statements for assessment <br> - Card game <br> - Teacher one on one opportunity <br> - Mixed Fractions Quiz |

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| 10-12. Oct. <br> 23-25 | Practicing Fractions with 12 Careers | Guest speaker will Skype and talk about how they use math and fractions in their jobs <br> Each student will choose one of the twelve career challenges to work on in pairs | Summative/ <br> Formative | - Guest Speaker <br> - Smartboard (Skype session with career examples) |
| :---: | :---: | :---: | :---: | :---: |
| 13. <br> Oct. 26 | Math Career Projects Begin | Students will be shown examples of what their projects can look like. <br> From a suggested list of careers, students can research different careers and make their choice. <br> Each student will fill out an application form where they state their chosen career, how this career involves fractions, and why they have chosen this career. This application form will be a scaffolding piece to guide their self-reflection paragraphs that will be written at the end of the project. | Formative | - Laptops <br> - List of careers that involve fractions <br> - Career Application Form |
| $\begin{aligned} & \text { 14-15. } \\ & \text { Oct. } 27 \\ & \text {-Oct } 30 \end{aligned}$ | Project Work Day | Students will continue to work on their project. They will research the career information (ie. what the job involves, salary, how they use fractions, etc.) | Formative | - Laptops <br> - List of careers that involve fractions |
| 16. <br> Oct. 31 | Flex Day | Guest speaker will present for the first 20 minutes for the class. <br> Students will be given Halloween colouring pages based on fraction equations. | Formative | - Guest Speaker <br> - Fractions Colouring Sheet |
| $\begin{aligned} & 17-18 \\ & \text { Nov } \\ & 1-2 \end{aligned}$ | Project Work Day | Students will continue to work on their project. They will research the career information (ie. what the job involves, salary, how they use fractions, etc.) | Formative | - Laptops <br> - List of careers that involve fractions |

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|  |  | Students will check in with the teacher. <br> If students are done their projects early, they can: <br> - Finished career challenges <br> - Help another student <br> - Work on worksheets <br> - Play fraction related games (Dominos, card games) |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 20. <br> Nov. 3 | Finalizing of projects/practice day | Students will finish up their final project and will practice a short presentation to the class covering the most important aspects of their project. | Formative | - Laptops <br> - List of careers that involve fractions |
| 21. <br> Nov. 6 | Math Career Showcase | Students will display their finished products to the grade 8 and 9 classes. They will give a short description of their project and will show how the career that they chose uses fractions. | Summative/ <br> Formative | - Laptops (If students have create an electronic project) <br> - Tables/desks for students to display their work <br> Career rubric |
| 22. <br> Nov. 7 | Unit review | Students will review their "I Can" statements. Students will write their self-reflection paragraphs using the checklist and a self-reflection guide . <br> Kahoot quiz to review adding and subtracting fractions. | Formative | - Link to Student Math Ninja "I Can" Statements <br> - Checklist and a Self-Reflection Guide <br> - Kahoot Quiz <br> - Additional Practice \& Review |

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| 23. <br> Nov. 8 | Unit exam | Students will complete a unit exam to wrap up the <br> unit. | Summative | Unit Exam |
| :--- | :--- | :--- | :--- | :--- |

## Appendix

What resources could you potentially use to enhance the unit and broaden the student experience and understanding about your topic? Consider audio, visual, technology, literature and community. Use APA formatting for your resources.

| Audio | Teacher, student partners, Career Mentors |
| :--- | :--- |
| Visual | Posters in the classroom <br> Photo booth \& pictures <br> Gardening exemplar <br> Career Day Student Products, Fraction videos https://www.youtube.com/watch?v=5juto2ze8Lg <br> https://www.youtube.com/watch?v=1thX9Qmloks (3:20-8:22), subtracting mixed numbers slideshow <br> https://www.slideshare.net/bayoung/subtract-mixed-numbers-presentation, Subtracting mixed numbers <br> video: https://www.youtube.com/watch?v=WF7L2waDwLw |
| Technology | Google form quizzes <br> Unit exam <br> Kahoot <br> Skype <br> Chromebooks or iPads |

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| Literature | Career handouts <br> Student checklist \& self-reflection guide <br> Student rubric <br> List of careers that require fraction knowledge <br> worksheets <br> Student "I can" statements <br> Student's final product of a fraction word problem |
| :--- | :--- |
| Community | Career Mentors will come in at the beginning of selected classes to discuss how they use math (specifically fractions) <br> in their career. There will also be an option for Career Mentors to Skype instead of coming for a class visit. |
| Other resources | Salary Survey:https://occinfo.alis.alberta.ca/occinfopreview/info/browse-wages.htmI <br> XP Math Website: http://www.xpmath.com/careers/topicsresult.php?subjectID=1\&topiclD=1 <br> Mystery box with measuring tools <br> Career costumes <br> Games in the classroom <br> Fraction coloring sheets |

