Teacher(s)	Smith,Moffitt,Workman	Subject group and discipline	5th grade math		
Unit title	Adding and subtracting fractions	MYP year	1	Unit duration (hrs)	40 hours

Inquiry: Establishing the purpose of the unit

Key concept	Related concept(s)	Global context
Relationship	Equivalence and model	Identities and Relationships

Statement of inquiry
Equivalence must be a factor in building some relationships

Inquiry questions
Factual— How do you find the sum or difference of fractions with unlike denominators? **Conceptual— How can you explain the reasonableness of your sum or difference compared to your addends, minuend, and subtrahend?** **Why do you need like denominators to add and subtract fractions?** **Debatable— Which method is the best to solve addition and subtractions problems for fractions with unlike denominators? (equation, visual model, number line, fraction bar, etc)**

Objectives	**Summative assessment**	
Criterion A: Knowing and Understanding i. select appropriate mathematics when solving problems in both familiar and unfamiliar situations ii. apply the selected mathematics successfully when solving problems iii. solve problems correctly in a variety of contexts. **Criterion D: Applying mathematics in real-life contexts** i. identify relevant elements of authentic real-life situations ii. select appropriate mathematical strategies when solving authentic real-life situations iii. apply the selected mathematical strategies successfully to reach a solution iv. explain the degree of accuracy of a solution v. describe whether a solution makes sense in the context of the authentic real-life situation.	Outline of summative assessment task(s) including assessment criteria: The student will complete a "Stuffed with Pizza" task. Given a real world problem, students will write an equation and draw a model to solve, defending their choices and explain their thinking. Students will have to choose and show a second way to solve the problem that is also accurate and explain and justify why that method is also correct. Goal: When students are given a real world problem involving adding and subtracting fractions, they must write an equation, draw a model, defend their thinking. Obstacles would include determining the operation to solve, choosing the best method to model, and putting into words the reasoning behind those choices. Role: The student is charged with deciphering through the details provided in the task and organizing a plan to solve since the tasks involves multiple steps to achieve the desired answer.	Relationship between summative assessment task(s) and statement of inquiry: The summative assessment task will demonstrate that combining and comparing fractions with unlike denominators requires using equivalent forms, whether they use models or equations. In addition, this task will provide students with the opportunity to defend and reflect upon their chosen method. If students do not fully see that equivalence is required in this relationship, they will not be able to correctly model and justify their work.

Audience: The audience in the task scenario is 'friends' of the student (Tito and Luis). They want the student to help determine who ate more pizza, because each boy thinks they ate the most. The student needs to convince his/her audience through mathematical processes and justify their reasoning for solving in that manner.

Situation: Tito and Luis are sharing 3 pizzas. Tito ate ¼ of a cheese, ⅜ of a pepperoni, and ½ of a mushroom pizza. Luis ate ⅝ of a cheese and the other half of the mushroom pizza. Tito says he ate more than Luis because Luis did not eat any pepperoni pizza. Luis thinks he ate more because he ate more cheese pizza than Luis.

Product: The student will plan what equation are needed to solve the task. The student will solve the equation in multiple ways, such as drawing a model and working through with an algorithm. The products of each student may vary if they chose different models (visual model, number line, etc) but the students will produce a justification as to why their model is

accurate and the best choice to use in the situation.

Standards and Criteria: Students work will be judged based off of rubrics for Criterion A and D. Students work will be judged on if they accurately modeled/defended in the 3 ways required and how they were able to reflect on their thinking and decision making for the mathematical processes taken to solve the multi-step task.

Approaches to learning (ATL)

In order for students to select appropriate mathematics, apply successfully, and solve in a variety of contexts they must have the thinking skills to use prioritization and order of precedence in problem solving.

Action: Teaching and learning through inquiry

Content	Learning process
5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.	**Learning experiences and teaching strategies** Students will first review basic fraction information (vocabulary, visual models, number lines, comparing to benchmark fractions, determining reasonableness before adding or subtracting by comparing size to ½ and 1) Students will use a variety of manipulatives (fraction strips, fraction bars, number lines, fraction circles, visual models) to show equivalence with creating common denominators. Students will transition from visual models to learning to create

5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.	equivalent fractions numerically by multiplying or dividing both the numerator and the denominator.
	Students will relate knowledge of finding equivalent fractions to solve adding and subtracting fractions with unlike denominators. They will learn that equivalence is required in this relationship. They will study examples of mistakes in people who did not create equivalence before adding and subtracting and compare it to the correct version. After comparing they will discuss and conclude how equivalence is required and how not proceeding with this rule negatively can affect the outcome of the answer.
	Students will watch interactive videos, play team games, participate in group and individual tasks. They will stair step from learning individual skills (adding fractions, subtracting fractions, adding mixed numbers, subtracting mixed numbers, word problems) to progressively a mixture of the skills they have acquired and being able to differentiate when each skill is called upon by analyzing the problem/situation at hand.
	Formative assessment
	Whiteboard, stations, toss and talk game, clip and cover game, 0-5 finger confidence, 4 corners, partner card match and solve
	Differentiation
	Problems will range from basic to complex, including multi-step problems. The task will have an beginner, middle and advanced portion. Teaching will evolve from basic elements to more rigorous thinking. Benchmark formative assessments will be in place in the unit to help assign station work. Students who have a gap in one area will work on strengthening that particular skill, or students who are mastering at expectation will be given more challenging multi-step

	work. Many of the games and centers are tiered with an intermediate, on level, and advanced option. Teachers will pre-select groups according to student's need.

Resources
TNReady textbook and workbook, Envision textbook, learnzillion.com, khanacademy.com, various teacher made games, Common Core Crosswalk workbook, Common Core Coach workbook, mangahigh.com, prodigy.com

Reflection: Considering the planning, process and impact of the inquiry

Prior to teaching the unit	During teaching	After teaching the unit
Basics of fractions: - modeling fractions with visuals such as area models and number lines - adding and subtracting fractions with unlike denominators - creating equivalent fractions - Reducing and simplifying fractions What does experience tell us to expect during this unit? - Students will struggle with subtracting fractions with borrowing What attributes of the learner profile does this unit offer students opportunities to develop? - inquiry - balance	- Teaching equivalent fractions the prior week helped students learn to create fractions with common denominators with ease, especially with showing area models with equivalent fractions. - Students learned both regrouping and changing mixed numbers to improper fractions to subtract with borrowing. Subtracting with borrowing was easier for most students than converting to improper. - Students do well with fraction strips to learn to 'trade' to create a common denominator so adding or subtracting can take place. Students also did well with modeling by drawing area models.	- Multiplication and division review will be included in bellringers and perhaps the day prior to introducing this lesson. Students need to be able to fluently recall facts throughout this lesson and many students still struggle with this. - Less time will be spent on introduction fraction review, and more on task practice once concepts have been mastered. - Reducing and Simplest form may be taught some before instructing, so that students can better recognize multiple solutions with equivalent fractions. - More time will be spent on models. - Studying area models with equivalent fractions was a HUGE help with

What potential multidisciplinary connection can we identify? - real world problems that use fractional amounts		modeling with adding and subtracting fractions.