EDCP342A Unit Planning Assignment

EDCP 342A Unit planning: Rationale and overview for planning a unit of work in secondary school mathematics

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School, grade & course: Tamanawis Secondary School, Math 9
Topic of unit (NOTE: This should be a unit you will actually be teaching on practicum!):
Rational Numbers

Preplanning questions:

(1) *Why* do we teach this unit to secondary school students? Research and talk about the following: Why is this topic included in the curriculum? Why is it important that students learn it? What learning do you hope they will take with them from this? What is intrinsically interesting, useful, beautiful about this topic? (150 words)   Rational numbers are fundamental to secondary school mathematics, forming the bedrock for many subsequent concepts in algebra, geometry, and beyond. In the Grade 9 curriculum, understanding rational numbers is essential because it provides students with the tools to work with fractions, decimals, and ratios—concepts that are prevalent in both academic math and real-world applications. This unit allows students to develop a deep understanding of operations involving rational numbers and their applications, which is crucial for solving real-world problems, such as budgeting, cooking, and even in various fields like engineering and economics. By learning rational numbers, students gain the ability to reason quantitatively and think critically about situations that involve proportionality, rates, and part-whole relationships. Understanding these concepts can help individuals when planning meals or scaling recipes, determining the best pricing models in business, or interpreting statistics in everyday life (such as understanding discounts or interest rates). Beyond the practical applications, the study of rational numbers is inherently beautiful in its simplicity and symmetry, as it unveils patterns in numbers that can be explored algebraically and geometrically. Ultimately, this unit aims to provide students with not only the mathematical skills necessary for future academic work but also a sense of confidence in applying these skills to real-life scenarios like managing personal finances, navigating measurements in home improvement projects, or making informed decisions based on data analysis.
(2) A mathematics project connected to this unit: Plan and describe a student mathematics project that will form part of this unit. Describe the topic, aims, process

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and timing, and what the students will be asked to produce, and how you will assess the project. (250 words)

The mathematics project for this unit will involve students working on a real-life application of rational numbers. The project will ask students to design a mini-budget for a fictional event of their choice, such as a school fair or a small community gathering. Students will be required to work with fractions, decimals, and percentages to allocate funds for different areas such as food, entertainment, and decorations. Through this process, students will apply the skills they have learned in the unit, such as adding, subtracting, multiplying, and dividing rational numbers, and using proportions to maintain balance in their budget. The project will be introduced in the second week of the unit, with a timeline of approximately one week for completion. During this time, students will research costs, perform calculations, and present their budget to the class. Assessment will focus on accuracy in calculations, creativity in the design of the budget, and clarity in the presentation of the final project. This project will help students see the practical side of rational numbers and understand how math can be used in decision-making processes in everyday life. Students will have a choice of making a poster or a powerpoint presentation for this project in addition to a 10 minute oral presentation where students will present their budget to the class.
Assessment: The project will be assessed based on three key criteria:
1. Accuracy of calculations: Ensuring that all operations involving fractions, decimals, and percentages are correctly executed and that the budget balances appropriately.
2. Creativity and clarity of the budget design: This includes how well the budget is organized and presented. Creativity can also be reflected in the way students visually represent their budget (charts, graphs, or thematic designs).
3. Quality of the presentation: Evaluating how effectively the student(s) communicate their budget, explain their calculations, and justify their decisions to the class.

(3) Assessment and evaluation: How will you build a fair and well-rounded assessment and evaluation plan for this unit? Include formative and summative, informal/ observational and more formal assessment modes. (100 words)

The Summative assessment for this unit will be the project mentioned above. The project will be designed to test both their mathematical skills (such as performing operations with rational numbers and solving word problems) and their ability to explain and justify their reasoning. Students will submit a written report or

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presentation, which will be assessed based on accuracy, logical reasoning, clarity of communication, and the ability to apply rational numbers to practical situations. This single summative assessment will provide a holistic evaluation of students' understanding of the topic, combining their technical skills with their ability to articulate and justify their mathematical thinking. Formative assessments throughout the unit, such as quizzes, observations, and peer reviews, will be used to monitor student progress and provide feedback, but the final project will serve as the conclusive evaluation of their learning.

Elements of your unit plan:
a) Give a numbered list of the topics of the 10-12 lessons in this unit in the order you would teach them.

Lesson	Topic
1	Introduction to Rational Numbers: Defining and understanding rational numbers as fractions, decimals, and percentages.
2	Comparing and Ordering Rational Numbers: Understanding how to compare rational numbers and put them in order.
3	Operations with Rational Numbers in Fraction Form
4	Operations with Rational Numbers in Decimal Form
5	Order of Operations with Rational Numbers
6	Learning Check 1
7	Introducing the Project, order of operations
8	Word Problems Involving Rational Numbers: Solving multi-step word problems that incorporate fractions and decimals
9	Review and consolidation of the unit
10	Learning Check 2 and work on project
(11)	Work Block to complete the project
(12)	Summative Assessment

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b) Write a detailed lesson plan for *three* of the lessons which will *not* be in a traditional lecture/ exercise/ homework format. These three lessons should include at least three of the following six elements related to your mathematical topic. (And of course, you could include more than three!)

These elements should be thoroughly integrated into the lessons (i.e. not an add-on that the teacher just tells!)
a) History of this mathematics
b) Arts and mathematics
c) Indigenous perspectives and cultures
d) Social/environmental justice
e) Open-ended problem solving in groups at vertical erasable surfaces ("thinking classroom")
f) Telling only what is arbitrary, and having students work on what is logically 'necessary'

Be sure to include your pedagogical goals, topic of the lesson, preparation and materials, approximate timings, an account of what the students and teacher will be doing throughout the lesson, and ways that you will assess students' background knowledge, student learning and the overall effectiveness of the lesson. Please use a template that you find helpful, and that includes all these elements.