EDCP342A Unit Planning Assignment

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

Your name: Evan Braun
School, grade & course: Seaquam, Precalculus 10
Topic of unit: Powers, Negative Powers & Prime Factorization

Preplanning questions:

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(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)

Prime factorization is useful because it shows the DNA of a number. All of the patterns that arise from a number can be determined using its prime factorization.

Negative powers are important when viewed through the lens of extending the pattern of patterns from the integers to the whole numbers. This is a topic that is well taught via an inquiry-based classroom. We will investigate what happens as powers get closer to the negative side of the number line. Most important breakthroughs in math occur when we extend patterns beyond what makes sense in our "real world." By abstracting powers away from their physical meanings, a deeper layer of understanding can be achieved.

The primes are beautiful because of their simplicity and complicated nature. The fact that they compose the fundamental theory of arithmetic yet are unpredictable to be found is a beautiful juxtaposition.

I am going to stress the importance of prime numbers in encryption to show real world applications. Prime numbers are very useful to build models and patterns out of because they are like the atoms of numeracy, unable to be broken down further. By demonstrating why this atom-like structure is interesting, useful, and beautiful, students will be able to manipulate the numbers around them and understand how prime numbers can be implemented to solve problems.

EDCP342A Unit Planning Assignment

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

Students will be asked to come up with a method of encrypting messages between their groups. Prime Factorization is incredibly important in encryption, will be a great tool for encryption, and will allow multiple strategies.

Class will meet and talk about what encryption is, and how codes have worked throughout history. The class will be spent talking about encryption using common words instead of Mathematical jargon and formulas. This class will be about learning how secret codes fundamentally work before abstracting this concept to the language of math.

The first aspect of assessment will be "How well do you understand encryption in the pre-computer era." Encryption has always existed; it just didn't require a mathematical aspect. This would require students to do research on the history of encryption and famous encryption methods. This first aspect will be taught and assessed during one class.

The second aspect would be to extend their concept of encryption and secret codes to become a purely mathematical concept that could be transmitted via computers. This will be framed by powers of primes and prim factorization, but if students are able to find other ways, they will be encouraged to follow their minds. This second mathematical aspect will take an entire class as a work period.

Students will be assessed on their methods of communicating via mathematical encryption. Their encryption models will be assessed on their: Simplicity, reliability, ability to keep other's from decrypting it.

Each group of students will present their method to the class. This presentation will allow student's to be assessed on their mathematical communication skills.

During the class time, I will be walking around the room assessing the effort that students are putting in to the project. It will not matter that a student is working on a good idea, only that they are working on AN idea. Effort will be formatively assessed over results.

EDCP342A Unit Planning Assignment

(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)

After every lesson, students will break up into groups and work with vertically oriented erasable surfaces. I will implement a learning classroom, meaning groups will be visibly randomized and only one pen will be offered per group.

Students will be posed a question that will incorporate the ideas they will have learned from the lesson. I will be constantly rotating around the class, observing how students tackle the problem. I will be formatively assessing students not on their ideas, but on the amount of engagement they have with the subject. Students that sit doing nothing will receive emerging/developing. A student that is trying even if they are not applying math properly will receive proficient, and students who are trying while also applying the math correctly will receive extending.

There will also be formative quizzes throughout the unit. While they will not be for marks, they will identify for the student where they need to direct their efforts in self-growth. There will be a project at the end of the unit where students present their secret codes that will be assessed summatively. There will also be a unit test that will constitute a summative assessment.

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	**Greatest Common Factors/ Lowest Common Multiples**
2	**Prime Factorization**
3	**Prime Factorization to solve GCF/LCM**
4	**Exponent Laws Review**
5	**Extending Patterns for Negative Exponents**
6	**Midpoint Quiz**
7	**Prime Factorization with Negative Exponents**
8	**Review of BEDMAS**
9	**Exponents in BEDMAS**
10	**History of Encryption**
11	**Encryption in Math**
12	**Unit Test**