# Mr. Braun - Lesson Plan

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| **Title** | Encryption | **Grade** | Pre Calc 10 | **Date** | N/A |
| **TC** | Evan Braun | **Subject** | Prime Factorization | **Time** | 70 min |

| **History of this Mathematics** |
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| The ancient Egyptians are credited with using simple substitution ciphers around 1900 BCE. The famous Caesar cipher, named after Julius Caesar, involved shifting letters in the alphabet by a fixed number.<br><br>The German Enigma machine played a significant role in World War II. The Allies, particularly the British at Bletchley Park, successfully decrypted Enigma-encrypted messages, contributing to the war effort. |
| **Art and Mathematics** |
| Encryption algorithms, especially those involving complex mathematical processes, can be visually represented in art. Artists might use patterns, colours, or shapes to represent the steps of an algorithm, creating visually captivating pieces. |
| **Indigenous Perspectives and Cultures** |
| Encryption principles align with the idea of securing sacred or ceremonial knowledge within Indigenous cultures. Just as certain information is restricted or protected, encryption serves as a modern analogy for safeguarding digital or written records of sacred practices. |
| **Social/Environmental Justice** |
| Prime factorization is a crucial part of encryption. Encryption allows communities to work with secrecy to ensure that their goals are not undermined. Encryption protects our world from becoming 1984. |
| **Thinking Classroom** |
| Students will be tasked with coming up with their own encryptions for secret messages. These encryption methods will start out less mathematically abstract at first, and then students will delve deeper into finding a method to implement prime factorization with encryption |

| **What is Arbitrary** | **What is Necessary** |
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| - Methods used to encrypt<br>- What information is encrypted<br>- Encryption needs to convey information, but only decipherable to the intended recipient | - How mathematical algorithms distort a message and undistort it<br>- How third parties will not be able to undistort the message |

| **Pedagogical Goals** |
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| Convey the importance of encryption in our daily digital lives.<br><br>Convey the idea that encryptions scramble a message, and cyphers descramble the message<br><br>Convey the idea that prime factorization is key to encryption in the digital space |
| **Preparation and Materials** |

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- Preconstructed conversation between myself and another teacher that uses prime factorization to solve
- White boards and whiteboard markers

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| **Learning Engagements** | **Opening** | | **Time** |
| | - What is encryption<br>- What is the history of encryption<br>- How has encryption changed in the 21st century vs historical uses | | 15 min |
| | **Retrieval** | | **Time** |
| | - What is prime factorization | | 5 min |
| | **Strategy** | | **Time** |
| | Define Cypher | Break apart what is needed to encrypt something traditionally<br>● Easy to decode if intended person, hard if not | 5 min |
| | Traditional Cypher | Thinking classroom where students try to come up with ways of creating traditional cyphers. Ask how it's easy to encode/hard to decode | 20 min |
| | Digital Cypher | Thinking classroom where students try to come up with mathematical ideas for digital cyphers. Again retrieving the idea that they are easy one way, difficult the other | 25 min |