A person might ask, "Where can you put cryptography into the classroom?" I'll answer that question with another question: "If someone were to ask you for a one-word definition of 'mathematics,' what word would you use?" I think the best single-word description of mathematics would be "patterns." Some will disagree, and say "numbers" or "change" or other words, but I think "patterns" is more accurate - after all, aren't there patterns in all of the above, as well as in many other places in mathematics? Think not only of number patterns, but algebraic patterns, geometric patterns, etc., and you'll find them everywhere in the PreK-12 mathematics curriculum.

If a person uses "patterns" as a one-word definition of mathematics, then it's easy to see where the subject of cryptography would fit into the curriculum – just about anywhere! Primary students can use a Caesar shift of letters to encipher a message, intermediate students can write a message using a Playfair or rail fence cipher and middle school and high school students can use frequency distribution and Vigenere ciphers to encipher and decipher messages.

When looking at curriculum in terms of NCTM's Principles and Standards for School Mathematics (PSSM), a unit on cryptography fits easily in many areas. Certainly, there are many applications in the realm of the "content standards." Data analysis and probability are found in cryptography, when using frequency distribution to decipher a message. Algebra is used when trying to understand the patterns, relations and functions found in secret messages. More than the content standards, however, is the application of cryptography to the area of the "process standards."

Most obviously, of course, cryptography is all about problem solving. Throughout history, cryptographers and their attackers have played a type of cat-and-mouse game, with the next level of encryption followed by the ability to decipher that level, which in turn necessitates another level of encryption. Certainly, entire wars and individual battles have been won, lost or shortened by the problem solving abilities of cryptographers breaking codes and ciphers put together by the opposing side, especially when the other side was convinced that its ciphers were "unbreakable."

In addition to the problem solving aspect, the other process standards are clearly evident when discussing cryptography in the classroom. Students working to decipher a message are thinking analytically and coming to logical conclusions about the meaning of the message, so the "reasoning and proof" standard is in play. Students will need to clearly communicate with each other and the teacher the different methods used to make and break ciphers. They are connecting mathematics with real-life situations outside the mathematics classroom and are representing various mathematical concepts in different forms (diagrams, matrices, written word, etc.).