Compression Code

By Kristy Barr

Intro: Share the chorus from a few songs that have repeating phrases in them. For example: "Give it Away" by Red Hot Chili Peppers; Da Da Da by Trio; Na Na Na by My Chemical Romance.
Discuss what they have in common. (repeated words or phrases.)
Ask: How can this relate to computer programming? (Guide discussion to longer files of code and trying to move them. Use real world examples such as vacuum bags to store blankets in, etc.)

Big files take a long time to transfer from one place to another. The more data you have the longer it takes and the more memory is needed to store the information. We, therefore, compress files first. Has anyone ever seen a zip file? Data on computers is stored as long sequences of characters. The idea with compression is that we use an algorithm to change the way the information is represented so that fewer characters are needed to store the exact same information.

That involves special codes. Each common word or phrase is replaced by shorter sequences of symbols. A long file can be made much shorter if it has lots of similar sequences. A second algorithm can be used to get the original back. We've turned this idea into a puzzle that involves pattern matching patterns from the code book. Can you work out what the original messages were?

For example:

32223111

Codebook:
1 [Da]
2 [Do]
3 [De]

By replacing the 1s in the message with "Da", 2 with "Do" and 3 with "De" we would get the title of a 1980s song from the group The Police!

Next, as a class, practice using the songs from the introduction using 1, 2, 3, etc. Then get in groups of 3-4 and come up with one song that has a repeated word or phrase and practice. After a few minutes, have groups share their codes.

Homework: Practice the compression code puzzle

Compression Code puzzle.pdf

Compression Code key.pdf

Lesson based on Compression Code Puzzle 1 by Paul Curzon, Queen Mary University of London