

K IS FOR KNOWLEDGE

The genre of music I've chosen for this song is klezmer, a type of Jewish folk music that started in Eastern Europe. More specifically, the instrumental choruses in this song are based on a klezmer style called kolomyjka, which is a circle dance popular at Ukrainian weddings.

Science is the search for knowledge. But what's knowledge? Well, there are several different types. Here are a few:

- Knowledge is skill. I know how to tie my shoelaces, or ride a bicycle. Although this type of knowledge can be applied to science (as in, "I know how to use a bunsen burner"), this is not what we mean by scientific knowledge.
- Knowledge is acquaintance. I have listened to songs by The Beatles all my life, therefore I "know" the music of The Beatles. I also know (I hope) all the words to the show *Ensonglopedia of Science*. And I know my parents. Again, this type of knowledge can be useful in science – for example, you could learn the whole periodic table off-by-heart, and would therefore "know" it – but again, this is not what we mean by scientific knowledge.
- Knowledge is fact. Or, as Plato defined it, "knowledge is justified true belief". I know that $1+1=2$, and no-one will ever be able to disprove me. I know that a circle is round, and that a square is square. I will never ever meet a not-round circle, or a not-square square. This is also known as rational knowledge – you can start with a set of statements that you know are true, and use your reason alone to have knowledge of other statements that must therefore be true. Sometimes, especially when working in theoretical physics using equations, scientists will use this type of knowledge. But it still isn't scientific knowledge.
- Knowledge is divine. People who have a religious belief will often claim that their knowledge comes to them from a book, such as the Bible or the Quran. They might also say that they "know God", claiming an acquaintance with him (type 2 above). This type of knowledge is very different from scientific knowledge, though there are people who think you can have both scientific knowledge and divine knowledge at the same time. I'm not going to tell you what I think.
- Knowledge is theory. I know that the Sun will rise tomorrow morning. But how do I know this? I cannot see into the future, nor (since I'm writing this at night-time) can I even be sure that the Sun still exists. No, all I have is a theory. The theory says that the Earth is round, and spins round the Sun, and both objects obey another theory called gravity, and if I'm confident in those theories, then I can be very confident that the Sun will rise tomorrow. And hey, even if I didn't know about the Earth being round, and I didn't understand gravity, I have seen the Earth rise in the morning thousands upon thousands of times, so I could still be pretty sure of my own theory "The Sun always rises in the morning". This is scientific knowledge. And one really important thing about this type of knowledge is that I might be proved wrong. The Sun might not rise tomorrow morning, and if it doesn't, it would simply mean that something is wrong with the theory. People who disagree with the theory of evolution sometimes complain that "It's just a theory". Well...yes...that's science for you. The only thing that can replace a theory is a better theory. But even that will be "just a theory".

This is a song about knowledge as theory. If you think that something might be true, test it. Then test it again, and again, until you're absolutely sure. And always be prepared to be wrong.