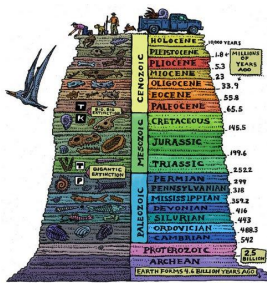


DNA molecule

```
20 def setSpace(size):
21     # size of the space will be size ** 2
22     space = {}
23     for w in range(size):
24         for h in range(size):
25             val = random.randint(1, 16)
26             if val == 4:
27                 space[w, h] = 'pizza'
28             else:
29                 space[w, h] = 0
30     w = random.randint(0, (len(space) - 1) // size)
31     h = random.randint(0, (len(space) - 1) // size)
32     position = (w, h)
33     space[w, h] = 'agent'
34
35     return space, position, size
```

Computer code



Fossil record

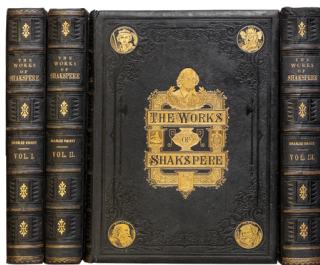


Plant growing towards light

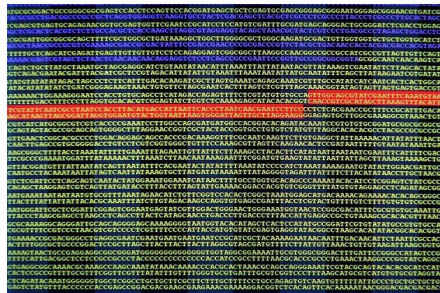


Google search engine

Periodic table of elements



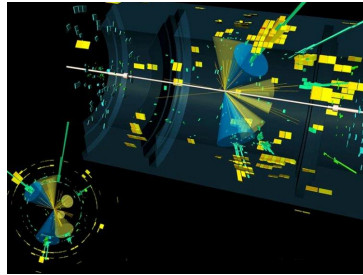
Complete works of Shakespeare



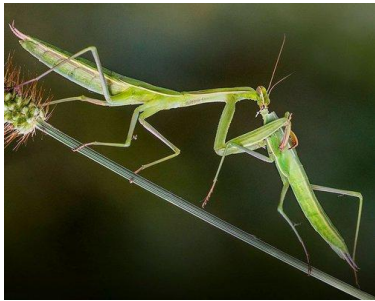
Genome represented by ATCG



Newborn human baby



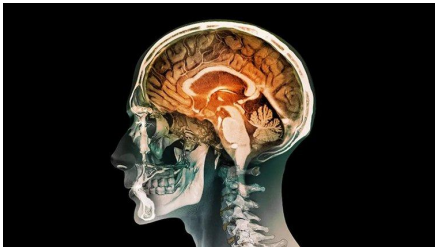
Data from Large Hadron Collider



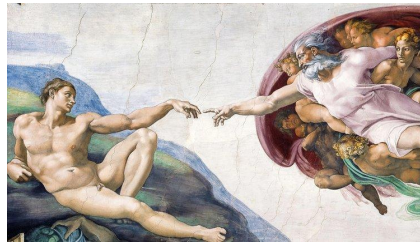
Praying mantis eating her mate



Rosetta stone



Human brain



Michelangelo's Sistine Chapel (detail)



Senegalese dance



Internet memes



New York Stock Exchange



Owl pellet



Figure 1.1 from [Müller, FMP, Springer 2015]

Musical score



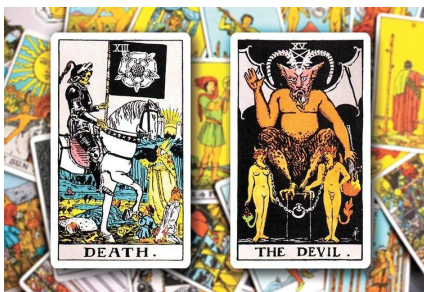
Human teenager with iPhone



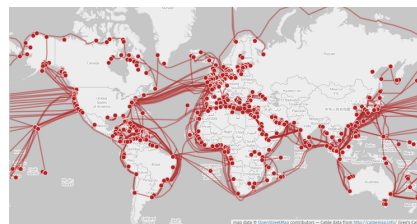
1944 war photo



Termite mound in Namibia



Tarot cards



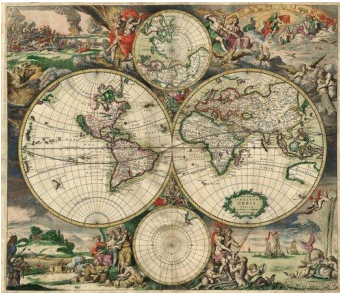
Submarine fiber optic cable map in 2015



League of Legends video game



Burning paraffin wax candle



1689 world map



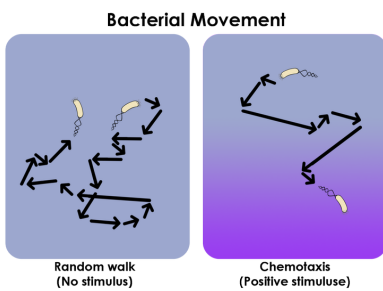
Beaver dam nest



Underground fungal network



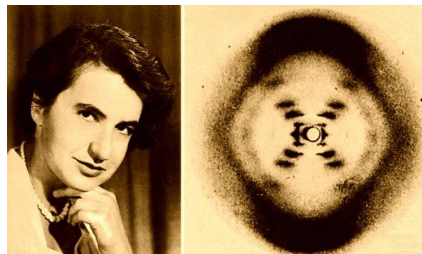
Toyota Prius hybrid technology



Random walk
(No stimulus)

Chemotaxis
(Positive stimulus)

Bacterial random walk behavior



Rosalind Franklin with DNA image 51

Guiding questions for the 32 knowledge scenarios

What, if anything, counts as knowledge here?

How is knowledge physically represented or encoded here?

To what extent is a conscious knowing subject involved here?

What is the role of human culture here?

DAVID DEUTSCH—KNOWLEDGE QUOTE

The way I think of knowledge is as broader than the usual use of the term and yet paradoxically closer to the common-sense use... Knowledge is a kind of information... It's something that could have been otherwise and is one particular way and... it says something true and useful about the world. ...knowledge isn't dependent on any particular instantiation. On the other hand it does have the property that when it is instantiated it tends to remain so.

This nuanced entry point to thinking broadly about the nature of knowledge was transcribed from *Surviving the Cosmos*, [Episode 22 of the Sam Harris Making Sense podcast](#) (00: 05: 30). David Deutsch is the founding father of the quantum theory of computation, Visiting Professor of Physics at Oxford University, and author of [The Beginning of Infinity](#).