

Physics of the Impossible

"Knowledge is limited. Imagination encircles the world."

Albert Einstein

- I. If you were to choose one of the areas listed below, which are still more of science fiction than the real field of study, to be possible, which one would it be and why?

- parallel universes
- teleportation
- invisibility
- time travel

- II. Can you think of any other issue similar to those above? Which one do you think is most likely to become possible in the future? When would it be?

- III. Can you see any dangers in making such inventions/discoveries real? Which ones?

- IV. Parallel universes (source- <http://www.sciencechannel.com/tv-shows/brink/videos/brink-multiple-universes/>). Watch the video and answer the questions below:

1. What is the name of the show's guest? What is the title of his book they are mentioning? Have you ever heard about it?
2. What is the latest theory on the origin of multiple universes presented in the video?
3. What does the physicist compare multiple universes to?
4. Why do we accept the possibility of "parallel worlds" if there is no evidence for it?
5. What is the Newtonian perception of time?
6. How Einstein's view differed from it?
7. What is the connection between multiple universes and the nature of time?
8. What can we learn about time one day?

- V. Read through the passage about time travel , and decide from the context which words/phrases should go into the gaps.

A wormhole is a shortcut through 1._____. Let's say I take a sheet of paper and mark two points on it. Usually, you have to go across the paper to go between the points. And now, if I 2._____ the fabric of it, I get half across, and thereby take a shortcut through it.

Another solution lies in travelling 3._____ the speed of light. There's one form of time travel that we can actually execute even today. That is, take 4._____, put him in a rocket ship and speed him towards the speed of light. In the ship time beats slightly 5._____ than on the planet Earth. As he orbits the Earth, he comes

back, he's actually a fraction 6. _____ younger than he would have been on the Earth.

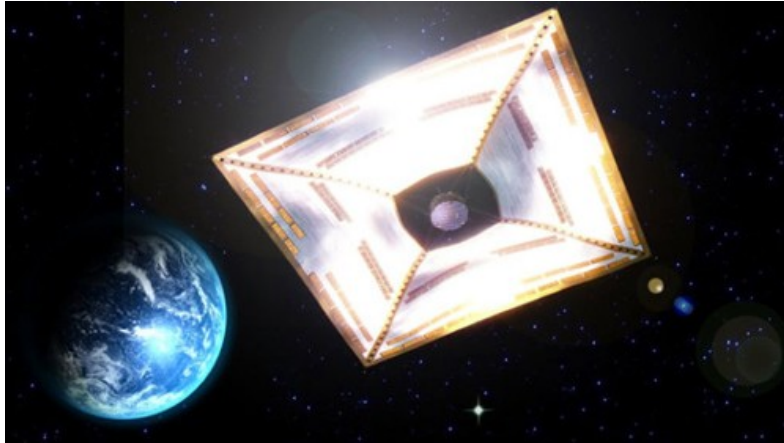
The faster you're going, the less time is being 7. _____, so yes, you can make one year to people here on Earth last a day for you, or minute, or second. It's just how 7. _____ to the speed of light. Physicists aren't able to prove one way or the other. They suspect it is 8. _____ to travel backwards in time, but it's an open question.

If we could do it, though, we might 9. _____ a metaphysical Pandora's box. It is known as the butterfly effect. It is when the wings of the butterfly create a 10. _____, which then eventually cascades into a 11. _____. So what happens if you go backwards in time and you effect butterflies? They can have a ripple effect, which then creates a situation where the present is 12. _____.

Then, there's the grandfather 13. _____. Simon Wells, director of the 2002 film version of his grandfather's novel (*"The Time Machine"*) says: "If I went back to the 1890s and 14. _____ H.D. Wells before he had children, therefore his son wouldn't have a son, and his son wouldn't give 15. _____ me, then how would I exist in order to be able to go back and 16. _____ him?"

Now listen to the recording and check your answers.

- VI. The history knows some "prophets of science", who had described strange devices or apparatuses in their literary works long before they were really invented. Could you name some of them? What inventions/discoveries are connected with them?
- VII. Decide who predicted these inventions:
- a) In an 1889 article, he described an alternative to newspapers: "Instead of being printed, the *Earth Chronicle* is every morning spoken to subscribers, who, from interesting conversations with reporters, statesmen and scientists, learn the news of the day." The first newscast didn't happen until 1920, according to the Associated Press—nearly 30 years after he imagined it. The first network-television newscast would have to wait another 28 years, according to CBS News.
 - b) In his 1865 science fiction classic he speculated about light-propelled spacecraft. Today, the technology has a name: solar sails.



- c) "Seldon removed his calculator pad from the pouch at his belt. Its gray, glossy finish was slightly worn by use. Seldon's nimble fingers, spotted now with age, played along the hard plastic that rimmed it. Red symbols glowed out from the gray..." – from a book published in 1951, when the only computers were room-sized, and the first computer terminal had only been invented a few years before.
- d) It was in one of his science fiction stories that he dreamed up an invention called the "telectroscope," which used the phone system to create a worldwide network of information-sharing. Basically, he invented the Internet. Keep in mind that he wrote this in 1898, when telephones were still fairly new and rare.
- e) Decades before the atom bomb was even a glimmer behind Einstein's bifocals, he had already written a novel about it in 1914. Note that he didn't know at this time that a nuclear detonation was actually possible - he just knew a little bit about radioactive decay and thought that, if we ever figured out a way to blow it all up at once, it would probably make a really big bang.

VIII. Find in the text above words corresponding with the synonyms/ definitions below

Par.a: other, different; a person who pays money, usually once a year, to receive regular copies of a magazine or newspaper

Par.b: to move, drive or push something forward or in a particular direction

Par.c: a small bag, usually made of leather, and often carried in a pocket or attached to a belt; able to move quickly and easily; to form an edge around something

Par.d: quite

Par.e: flash, sparkle; eyeglasses

IX. Is there something that you would like to be invented? What would it be? Why just this thing?

Sources: <http://www.sciencechannel.com/>