50 Science Misconceptions - mental_floss on YouTube (Ep.18)

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Hello! I'm Hank Green.

In the 16th century, British cardinal Thomas Woolsey said, "Be very very careful what you put into that head, because you'll never, ever get it out." Well, today we're gonna try. Prepare to empty your brain of these 50 common misconceptions, myths, rumors, and old wives' tales about science.

(Intro)

1. Let's start with dinosaurs. Did you know that the Brontosaurus never even existed? 19th century paleontologists mistakenly attached the skull of a Camarasaurus to the skeleton of an Apatosaurus, and someone called it a new species. The mistake was discovered in 1903, but it wasn't until 1979 that the last museum corrected its skeleton.

2. Pterodactyls and other pterosaurs that you may know as flying dinosaurs were not in fact dinosaurs.

3. Also, birds did not evolve from pterosaurs. Birds are a subgroup of dinosaurs.

4. The far side of the moon is not the dark side of the moon. We don't see it because the moon is tidally locked with the Earth, but the far side receives just as much sunlight as the side that faces us.

5. Speaking of tides, the moon is not solely responsible for the phenomenon. The sun's gravity plays a role here as well, albeit a much smaller one.

6. The sun, by the way, is not on fire or burning. What you're seeing is an enormous nuclear reaction as the sun fuses hydrogen atoms into helium.

7. Also, there are eight planets in the Solar System. No matter what you're trying to prove, Pluto was demoted in 2006.

8. Polaris, i.e. the North Star, is not the brightest star in the sky. It's actually between the 45th and the 49th brightest, depending on the time of the year, if you include the sun, which you should.

9. Stars do not twinkle, despite what you may have heard from a popular nursery rhyme. The light from the stars is refracted as it passes through our atmosphere, distorting the image that reaches our eyes.

10. The first American in space was not John Glenn; it was Alan Shepherd, who took a suborbital flight on May 5th, 1961.

11. As for other space travelers, Sally Ride was not the first woman in space. That would be Soviet cosmonaut Valentina Tereshkova who, at the age of 26, became the first woman in space on June 16th, 1963, 20 years and two days before Sally Ride's ride.

12. Space is not devoid of gravity. Let's just say that there's enough of it out there to keep all the stars orbiting the center of the galaxy.

13. Killer whales are not whales. They are actually the largest member of the dolphin family.

14. As for your pet goldfish, it has a memory span of longer than three seconds, possibly for as long as a few months, so don't torture it.

15. Adding salt to water raises its boiling point.

16. Speed and velocity are not interchangeable.

17. Neither are mass and weight. Weight is a measurement of the strength of gravity acting on a specified mass.

18. And since we mentioned it, please remember that gravity is not a downward force.

19. Hens don't require the assistance of a rooster in order to lay an egg; it will just happen to be an unfertilized egg.

20. A duck's quack echos just like any other sound.

21. The sound you usually associate with bald eagles, like during the opening sequence of the Colbert Report [(or Crash Course US History)] is usually the much more menacing sound of a red-tailed hawk that's been spliced in. The bald eagle actually sounds like a cross between a squeaky toy and a seagull.

22. And since we're on the subject, birds will not abandon or reject their babies if they've been touched by humans.

23. Nor will they refuse to sit on eggs that have experienced a similar trauma. Disturbances around their nest is typically what causes them to leave.

24. Bats are not blind. Most just use echolocation as their primary sense, but all bats also have a working set of eyes.

25. You've also probably heard that the lifespan of a pesky housefly buzzing around your house is only 24 hours so you might as well just wait for it to die. Unfortunately, or fortunately for the fly, it's more like 20 or 30 days.

26. One dog year is not equivalent to seven human years. Very generally speaking, a 1-year-old dog is between 10 and 15 human years old. The second year is equal to about 3-8 human years, and every year after that is 4 or 5 human years, but of course this can vary a lot based on the size and breed of the dog.

27. Flowering sunflowers do not track the sun across the sky, but the directions their heads point is almost always east.

28. The Coriolis Effect has no bearing on which way the water drains in the bathtub or your flushing toilet, and it doesn't change depending on which hemisphere you're in.

29. Glass is not a supercooled liquid. It's also, though, not a solid. Glass is actually an amorphous solid, a state somewhere between those two familiar states of matter.

30. You can thank Aristotle for the misconception that humans only have five senses. Depending on your definition, we actually have between 9 and 20, including our ability to sense balance, acceleration, and pain.

31. And speaking of senses, your tongue is not divided up into separate sections that each correspond to a different taste sensation. Every area of the tongue can taste sweet, sour, savory, salty, and bitter foods that you put into your mouth.

32. The seasons are caused by the Earth's 23° axial tilt, not by our distance from the sun, which is what I was taught in science class.

33. The equinox does not mean that the day and the night are the same length everywhere in the world. It's actually just a specific moment of astronomical alignment that happens twice a year, when the Earth's axis is exactly perpendicular to the sun.

34. You may have heard that lightning never strikes the same place twice. Well, the Empire State Building would like to squelch that

misconception. It was struck about 100 times last year.

35. And, despite what you've seen in movies, meteorites are not always hot when they crash into the Earth. Some have been found covered in frost.

36. There is no chemical that will turn a certain color to indicate if someone has peed in the pool.

37. The average person does not swallow eight spiders per year while sleeping. Thank goodness.

38. Alcohol does not actually kill brain cells, but that doesn't mean that I still won't use that myth on my teenagers if I ever have any.

39 & 40. The blood in your veins is not blue, and that means that your blood does not immediately turn red when oxygenated upon contact with air. I think I just clued up two misconceptions there -- yup, definitely counting those as two.

Ten more to go. We can do this

41. Despite what the Italian court system says, as it did when it sentenced six scientists to prison terms, it is not possible to accurately predict earthquakes.

42. Centrifugal force isn't really a thing. It's just the same thing as centripetal force, just viewed from the opposite point of reference.

43. The core of the Earth is not molten. The core of our planet, which has a radius of more than 700 miles, is essentially a solid ball of nickel and iron.

44. Despite what Ferris Bueller may have implied, most diamonds do not come from coal. The vast majority of discovered diamonds predate plants, therefore predating coal.

45. Galileo did not invent the telescope, though he did dramatically improve it.

46. Watson and Crick, they figured out the structure of DNA. They did not discover it.

47. The reason there's no Nobel Prize for mathematics is not because Nobel's wife was having an affair with a mathematicians.

48. Copernicus was not the first person to suggest a heliocentric model for the solar system. Others long before him, including Heraclides, understood that the Earth went around the sun.

49. Charles Darwin did not coin the phrase "survival of the fittest". He borrowed it from an English philosopher, Herbert Spencer, and used it in chapter 4 of *On the Origin of Species*.

50. Finally, if there's one misconception about science itself that I can rid your brain of today, let it be this: correlation does not imply causation, so just because the peak corn dog eating time each year here in Missoula is also usually the hottest time each year, a correlation, that does not mean that hot weather makes us eat corn dogs or that corn dogs make the weather hot. It's really because of a third element, the state fair, which happens to occur in the middle of the summer and has one million corn dog vendors.

Yes, I know many of you know this, but a distressing number of people out there do not. Read your science news carefully, and remember, correlation does not imply causation. Got that? Say it three times and my job here will be done.

And there you have it -- 50 misconceptions about science. Thank you for watching mental_floss here on YouTube. It is made with the help of these nice people. By the way, mental_floss is also a real life physical magazine, and there's an online store where, if you enter the code "YoutubeFlossers", you'll get 15% off your order.

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