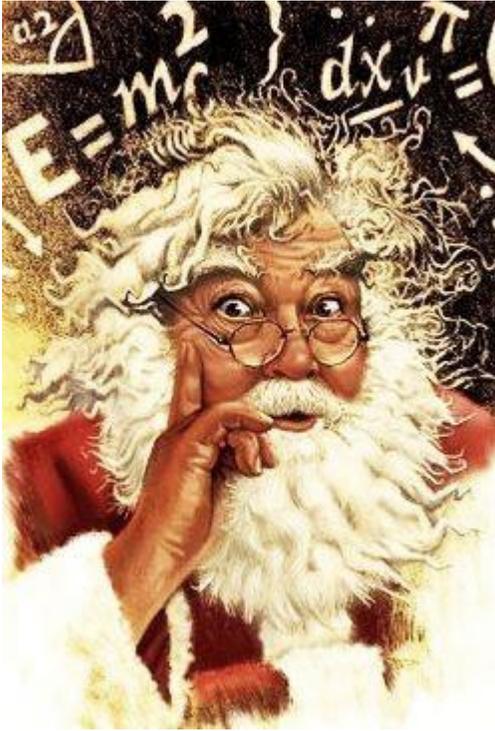


# The Science of Santa Claus



We all know about Santa Claus, St. Nicholas, or Father Christmas. But how does he do it all in just one night? Is there a scientific explanation for Santa? The good news: **YES!**

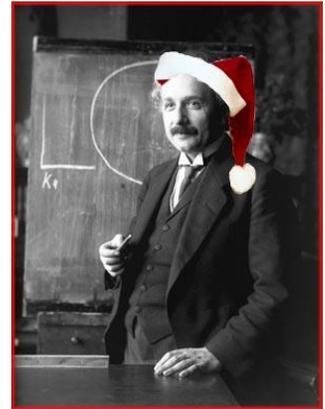
Santa has many helpers, Rudolph and the reindeer, many elves, and Mrs. Claus. Living in the North Pole, he must travel very far from his home to do his job. The Earth is a very big place. How could he possibly do it?

## Scientific Proof of Santa's Amazing Abilities

Albert Einstein said that the faster an object travels, the more the time around the object slows down. Science has proven this concept, it is called **time dilation**. This goes a long way to explaining how Santa is able to travel the world and deliver the presents in one night. While we go to bed and sleep for eight hours, Santa is moving so fast that

time slows down for him. Because he is the only one moving at this high rate of speed he is the only one affected by time slowing. This means he has more time to deliver the presents. This also means that he does not age so Santa will be around for a very, very long time!

Einstein also stated that the faster an object travels the smaller it becomes. This is called **length contraction**. This means that if Santa can move fast enough he can fit into the smallest places. Not only fireplaces, but he can fit through the smallest cracks, under doors, even under window sills to deliver presents to the children no matter what kind of house they live in.



Now it is your turn! Choose one of the topics below and come up with one or more scientific principles that could explain Santa's "magical" abilities:

**How can reindeer fly?**

**How can Rudolph's nose light the way?**

**How can Santa store presents for everyone in one big red bag?**

**How does Santa get his energy?**

**How can Santa fit down chimneys?**

A few resources:

<https://www.npr.org/2012/12/24/167946053/the-science-behind-santas-christmas-eve-journey>

<https://www.snopes.com/holidays/christmas/santa/physics.asp>

<http://www.telegraph.co.uk/topics/christmas/8188997/The-science-of-Christmas-Santa-Claus-his-sleigh-and-presents.html>

[https://en.wikipedia.org/wiki/Time\\_dilation](https://en.wikipedia.org/wiki/Time_dilation)