Our immune system protects us from illness. In most cases it keeps us healthy, but particularly when we are very young or old our immune system may be unable to act fast enough and we become unwell. A surprise observation by English doctor and scientist, Edward Jenner, in 1796 led to a revolutionary finding and way to help our immune system protect us even more.

Helping our body help itself
In Edward Jenner’s time there was an outbreak of smallpox with more than a third of people dying from this virus or left severely scarred or blind. Edward noticed most milkmaids were well and appeared protected from the disease. Jenner had an idea (hypothesised) that milkmaids caught a different sort of pox, called cowpox from the cows, which was a less severe virus and meant they were protected from catching the more serious smallpox virus. Jenner found that taking a sample from a cowpox blister from one person could help another person become protected from the disease. This led to the invention of vaccines to protect us from serious illness.

Jenner’s legacy
In most cases when we are unwell it is our own body that helps us get better. Jenner’s discovery led to a way we can help prepare our body so our white blood cells are ready if ever we encounter the virus or bacteria again. These days there are different types of vaccines which help boost our body’s immune system including showing our body just a tiny bit of the outside of a virus, or bacteria, or a more complete version that is harmless to us. Thanks to Jenner’s discovery leading to vaccinations, the last person diagnosed with smallpox was in 1977, and by 1980 this disease was completed eradicated as a cause of human suffering.

Take a look at the drawing to see the surprising beauty of flu virus. At this scale the virus particles are so small they cannot be seen well even using the most powerful microscopes. Increasingly scientists are using more detailed understanding of the components of viruses, including computer models, to help create new vaccines. The flu virus can evade our immune system through evolving and so scientists need to continually create new vaccines for each new virus strain. The line is a scale and represents 10 nanometres (one hundred thousandths of a millimetre). More than 1,000 flu viruses would fit across the width of a human hair.

While some of us may not enjoy having an injection, vaccines are the safest and the most effective way to protect ourselves and those around us from serious diseases. When most people are vaccinated within a community, protection for everyone, including those who cannot be vaccinated, is high. This is called ‘herd immunity’. Where fewer people have been vaccinated the whole community becomes vulnerable to developing the disease and passing it on to others. This can be especially dangerous for the very young, old or those with weak immune systems. Vaccines help each other and our body do its wonderful thing. We will never know all the diseases our immune system has saved us from; it is our everyday hero. We hope you have enjoyed finding out more about your amazing body, vaccines, bacteria and viruses while getting creative at the same time.