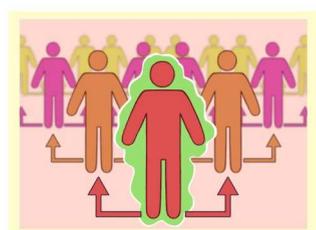
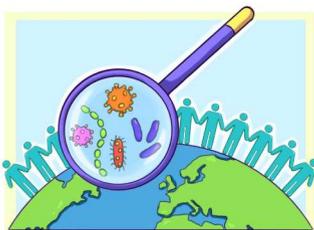
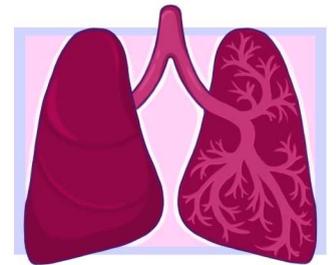
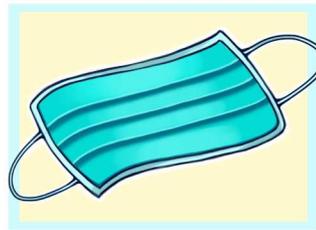
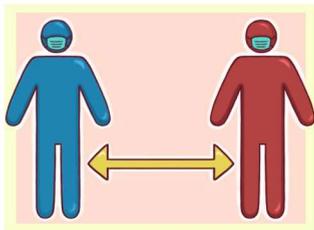


The ABCs of COVID-19

The science behind the pandemic that changed our lives



By Jen Harper and Kharis Brown

ABCs of COVID-19

By Jen Harper

Illustrated by Kharis Brown

Edited by Charlie Harper

Learn about the science of COVID-19, from antibodies to zoonotic diseases!

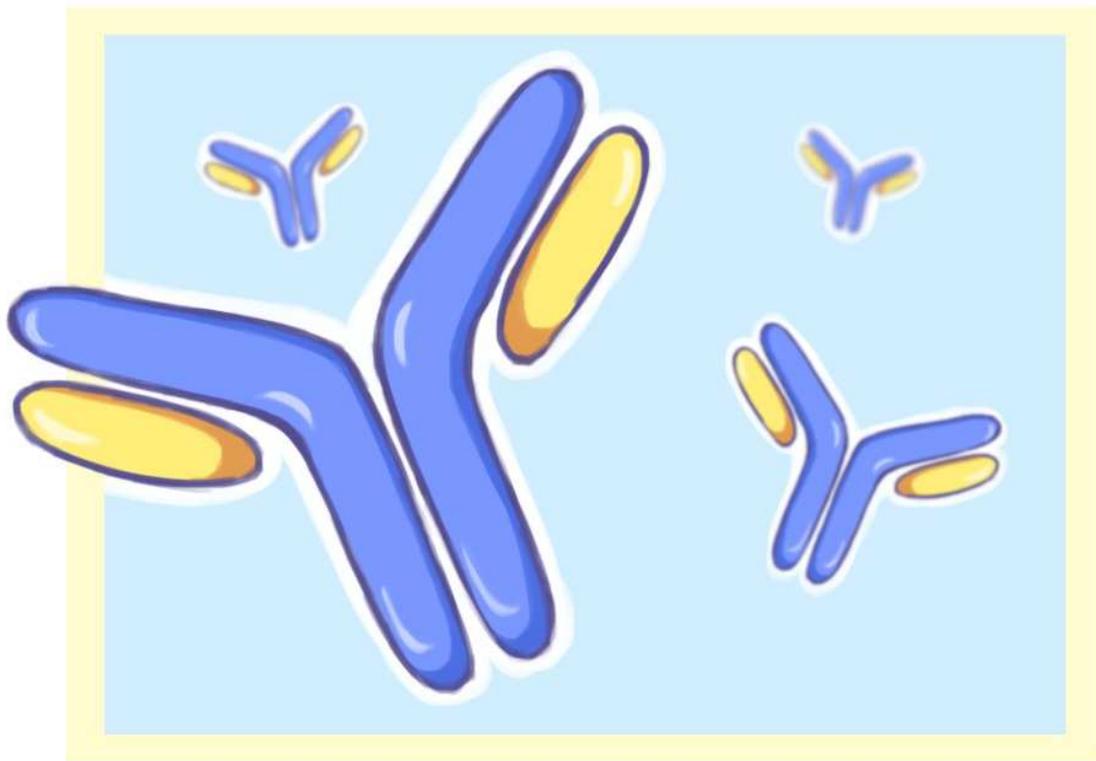
In this book, I explain the science of the pandemic that changed everyone's lives, brought to life for the whole family to enjoy. I believe that young children are capable of learning ambitious concepts, and take great pride in showing off their knowledge! This book is designed to present scientific facts in an accessible yet challenging way, to help its readers understand the world we live in without evoking fear or worry. Hopefully adults can learn something new, too!

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Happy learning!

A is for Antibodies

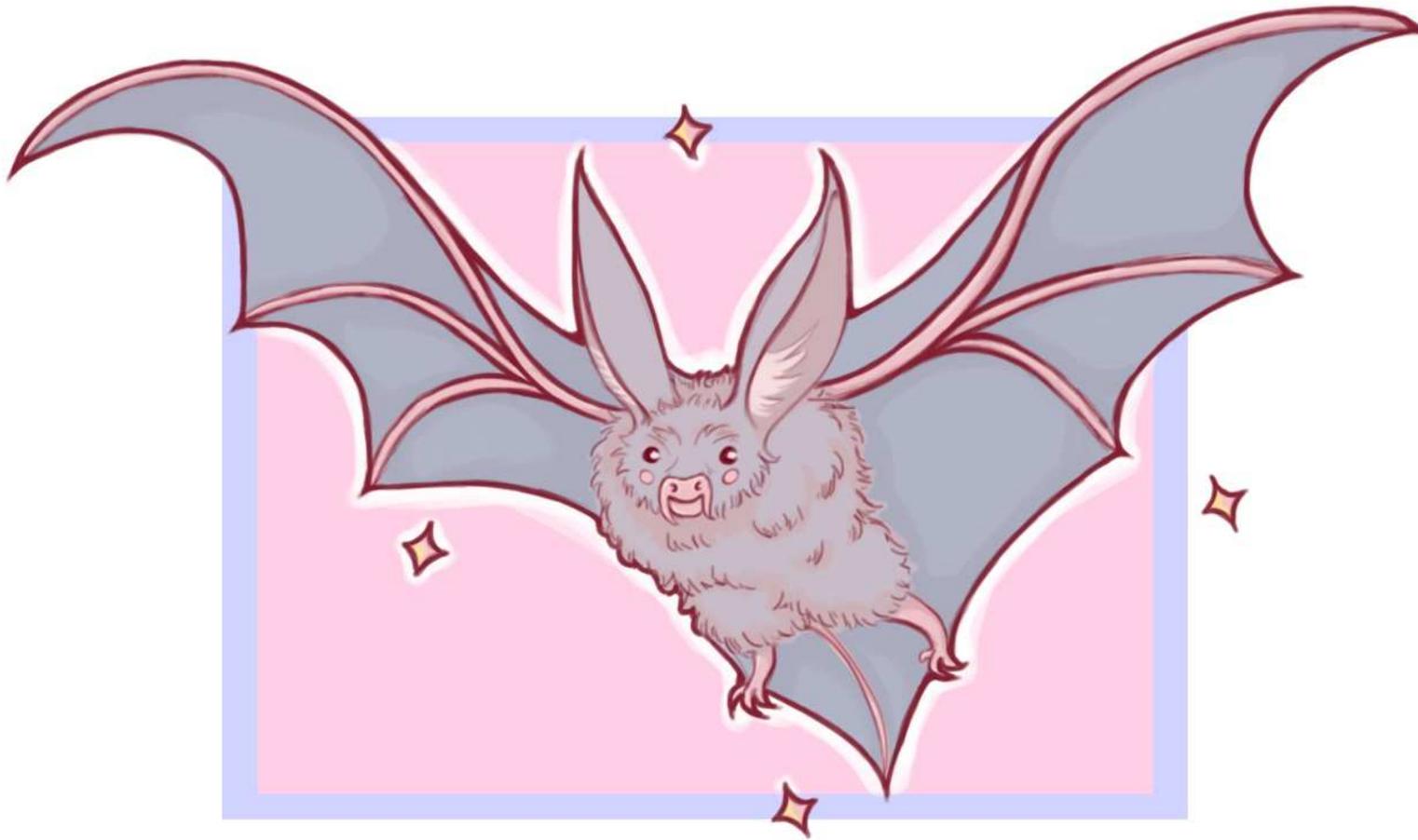
Antibodies are made by the body to fight infection



Antibodies to COVID-19 may be found in those individuals who have had the virus and have some level of immunity. Because this is a new virus, scientists are trying to learn how long antibodies will be present in the blood of someone who has had COVID-19. It is important to understand how long immunity lasts, as some diseases are better remembered by the immune system than others.

B is for Bat

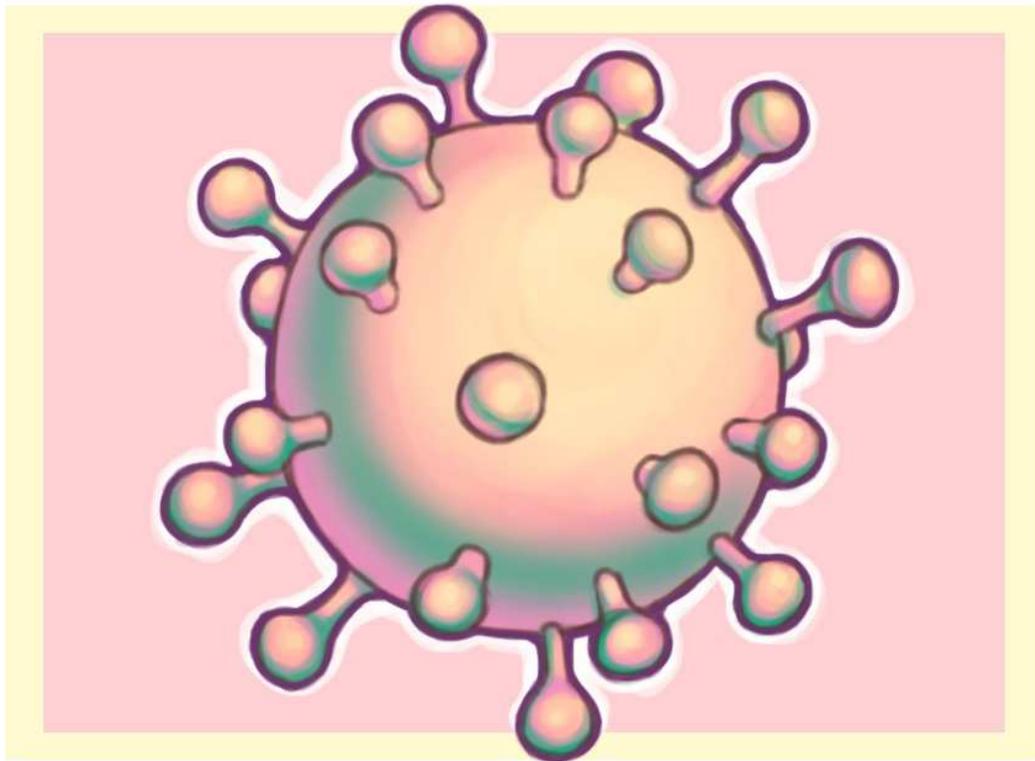
It has been suggested that SARS CoV-2, the virus that causes the disease COVID-19, originated in bats



Sampling of colonies of bats have found that bats host a huge number of viruses, many of which have the potential to pass to humans.

C is for Coronaviruses

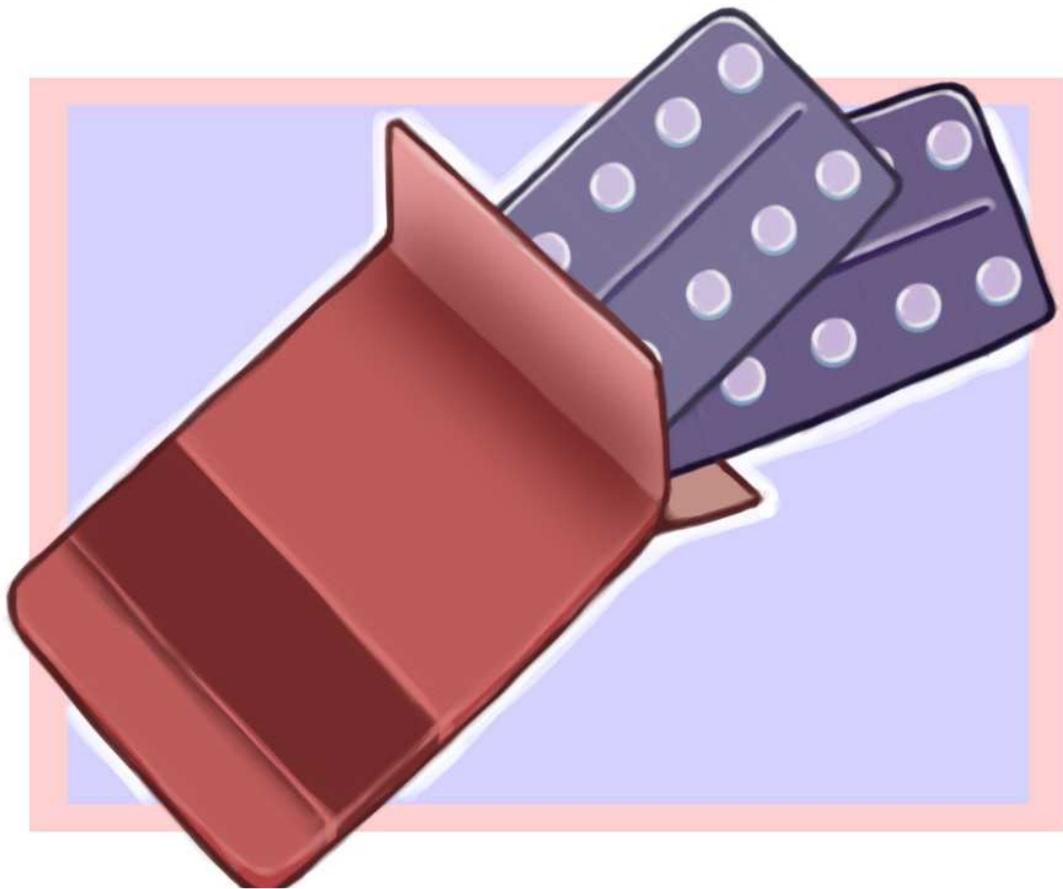
Coronaviruses are a family of viruses that cause coughs and colds



Other families of viruses, such as Picornaviridae (which causes rhinovirus, a form of the common cold) and Orthomyxoviridae (which causes influenza, or 'flu) can also cause respiratory symptoms in humans.

D is for Dexamethasone

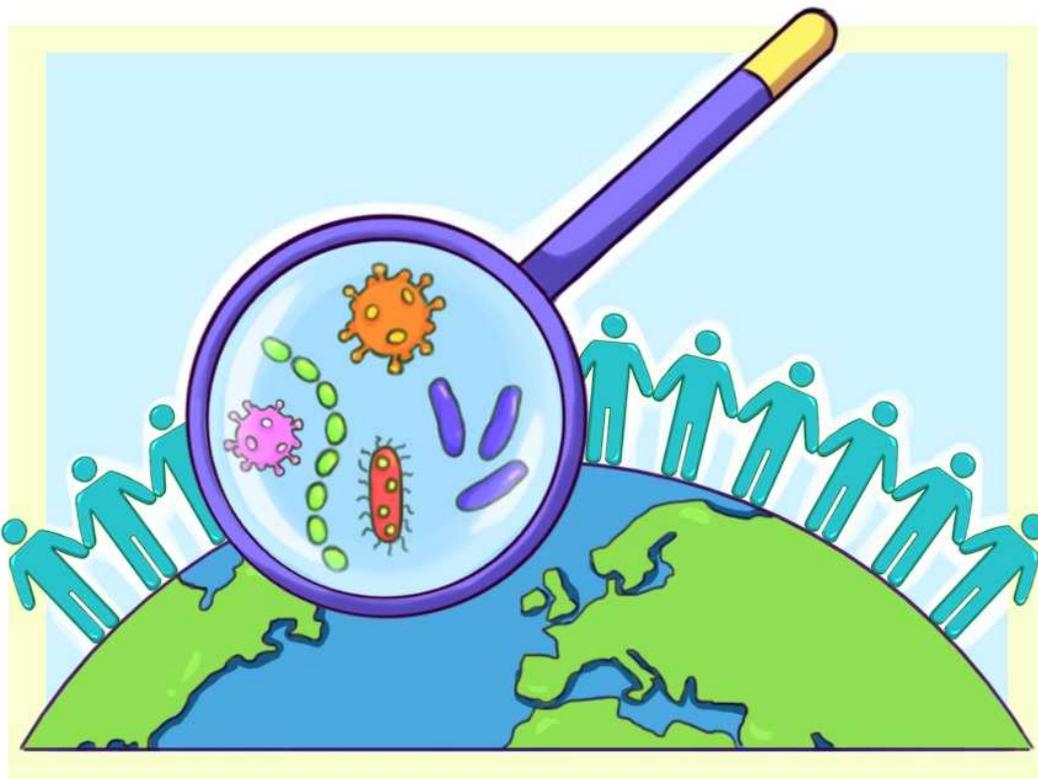
Dexamethasone is a medication that may help those with severe forms of COVID-19



Dexamethasone is a glucocorticoid, a type of steroid which works to reduce inflammation in the body by suppressing the body's immune response. In some people with severe forms of COVID-19, inflammation causes organ damage. Clinical trials have found dexamethasone can be an effective treatment for the sickest patients.

E is for Epidemiology

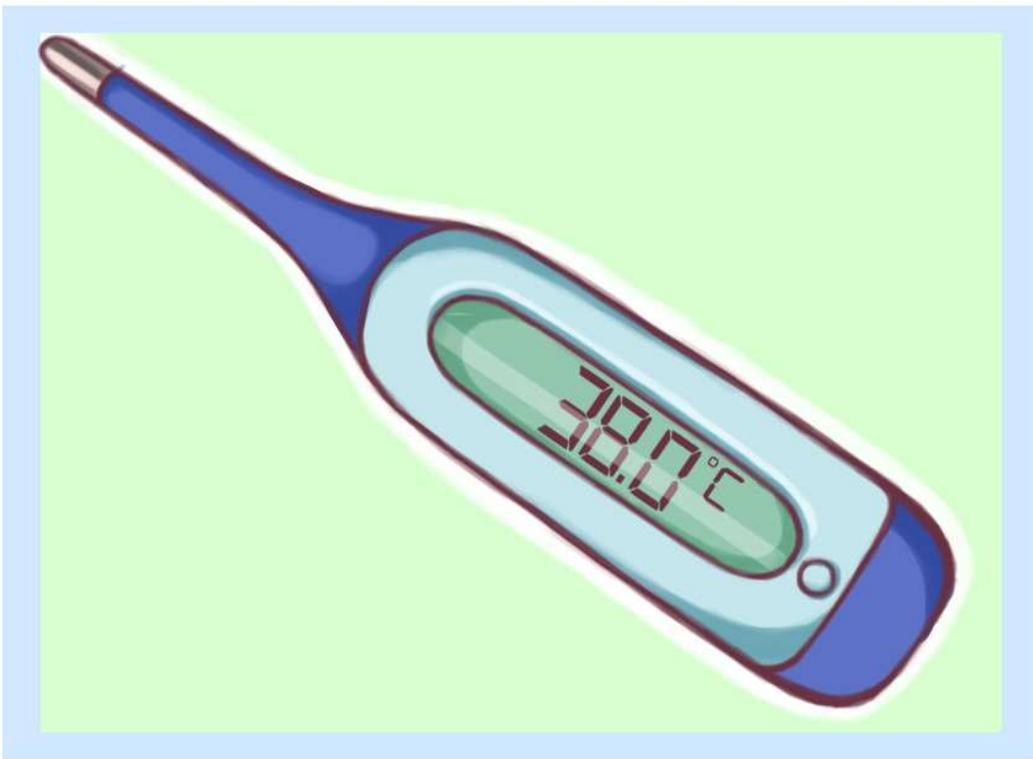
Epidemiology is the study of disease



Scientists that study epidemiology are called epidemiologists. They study the aetiology (cause), spread and treatment of disease, including infectious diseases such as COVID-19, at a population level.

F is for Fever

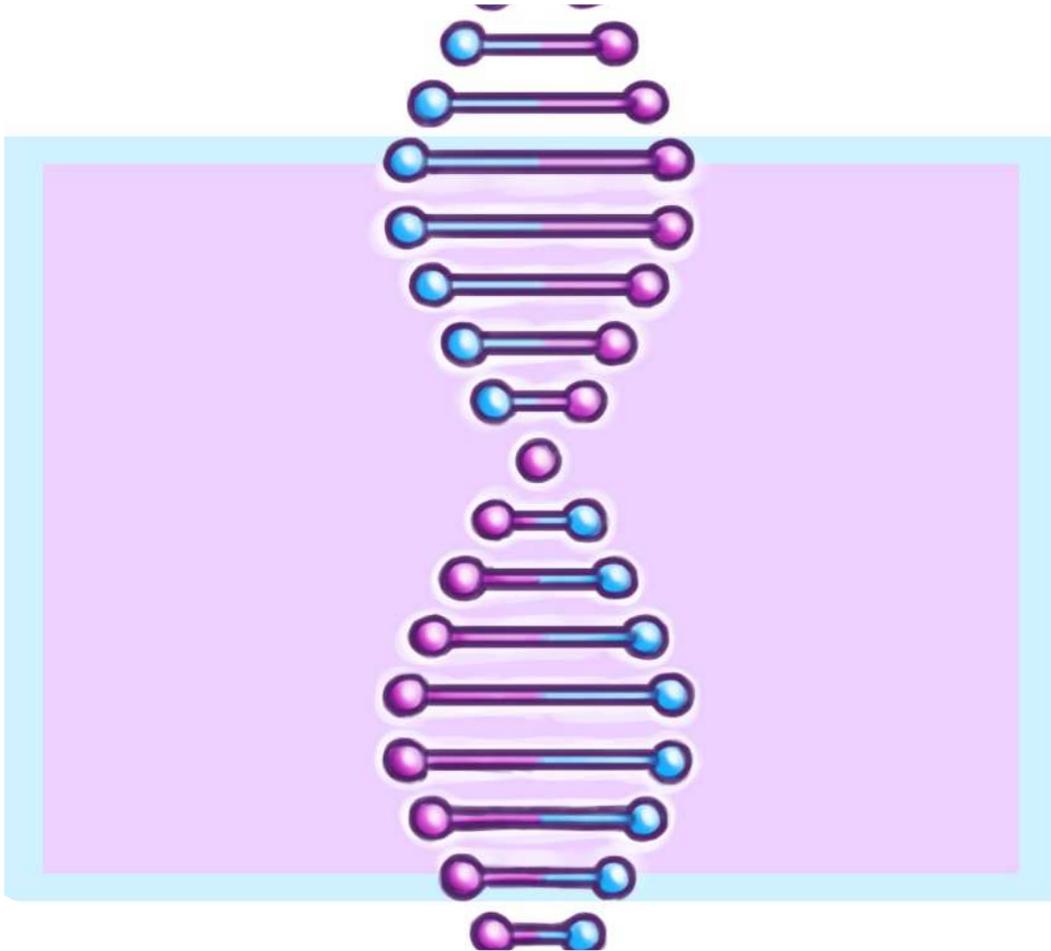
A fever is a body temperature which exceeds
38°C



A fever is produced by the immune system in response to an infection. Part of the brain called the hypothalamus raises the body's core temperature to help the body to fight the pathogen.

G is for Genetic Sequence

A genetic sequence is the order of chemicals in the DNA or RNA of a living thing



Imagine an alphabet with only four letters, which can be used to create many different words. You can arrange these words to tell a story. A genetic sequence is like a set of instructions which controls how a living thing works, written from an alphabet of only four letters. Understanding the genetic sequence of SARS CoV-2 will help scientists to understand the disease and, hopefully, develop successful treatments.

H is for Handwashing

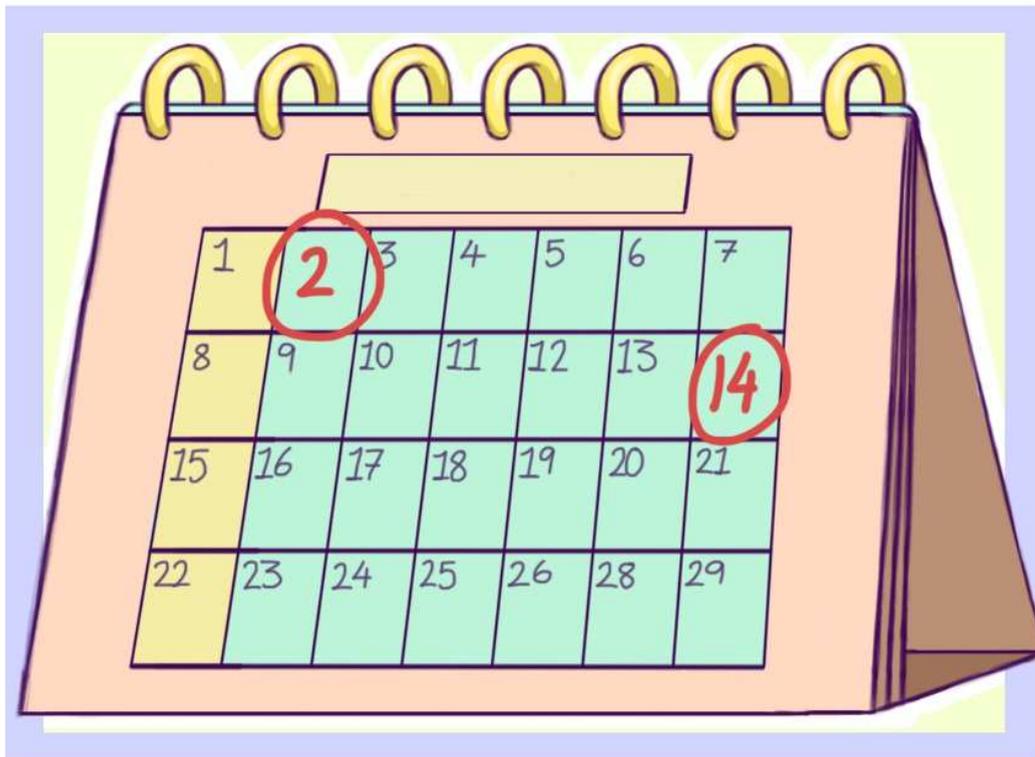
Handwashing is an important practice to reduce the spread of infections



Washing hands more often, and for 20 seconds, helps to remove pathogens which could otherwise be transferred to a person's face or another surface, where they have the potential to enter the body and cause disease.

I Is for Incubation Period

An incubation period is the time it takes for a person to develop symptoms once they have picked up the initial pathogen



During a virus' incubation period, it is replicating in the body. A person's symptoms (such as a fever) are caused by the immune system responding to the virus. It is thought that this can take up to 14 days with COVID-19.

J is for Journal

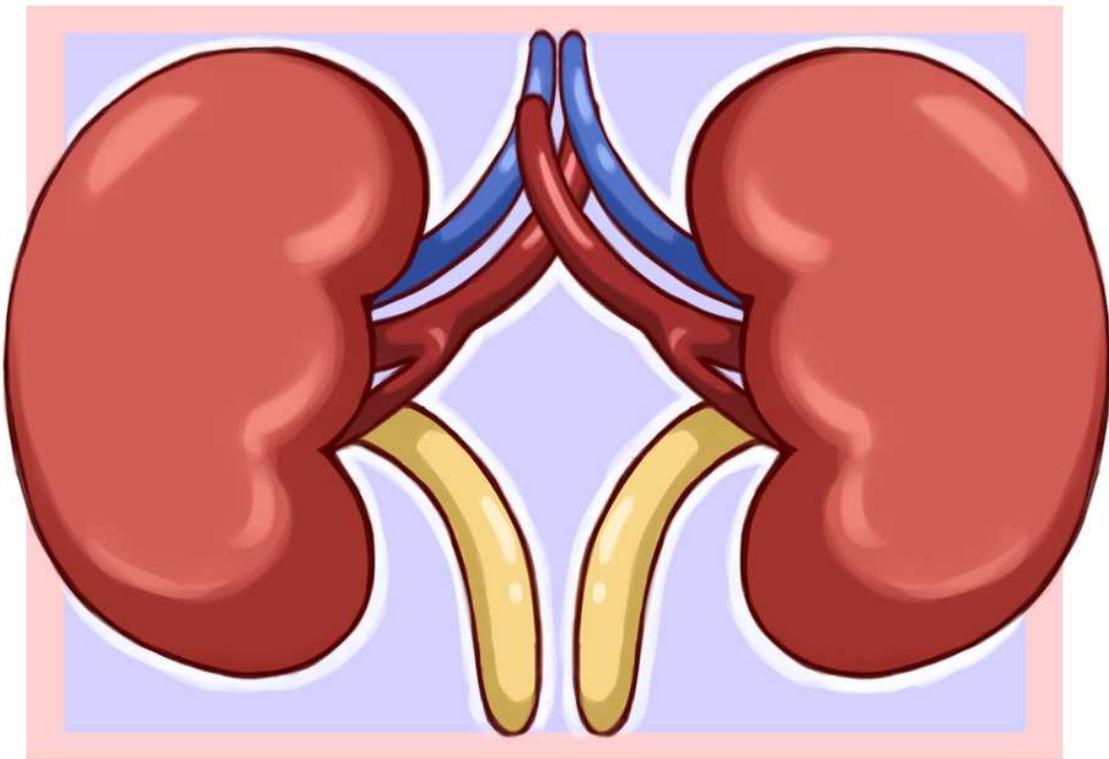
A journal is where the results of scientific research are published



Information in journals is viewed as reliable as it is peer-reviewed by other scientists working in the same area of research. They check the work has been completed to a high scientific standard and without bias. A lot of information regarding COVID-19 was communicated in the media, but the accuracy of the media cannot always be trusted as it tends not to be written by scientists. Information in journals tends to have more scientific credibility, however it can take much longer to produce.

K is for Kidneys

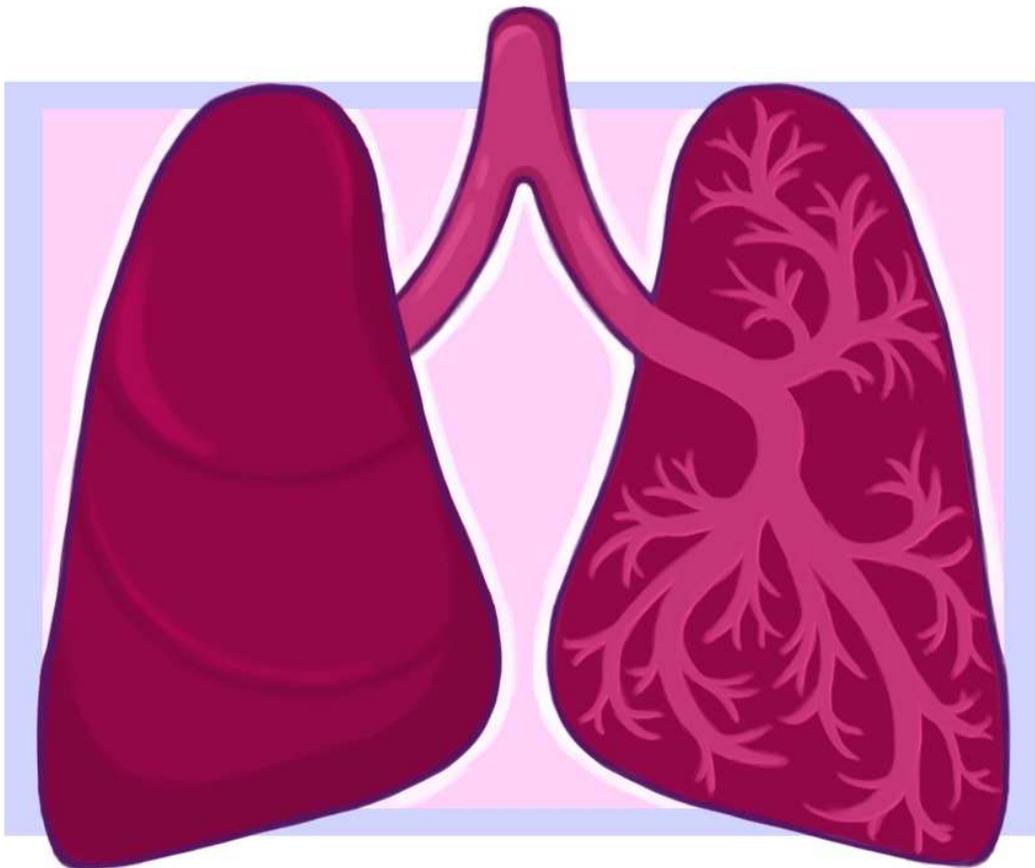
Kidneys are organs which filter out waste from the blood and help regulate blood pressure



Severe COVID-19 has been associated with kidney damage due to reduced oxygen being taken into the body and reaching the kidneys.

L is for Lungs

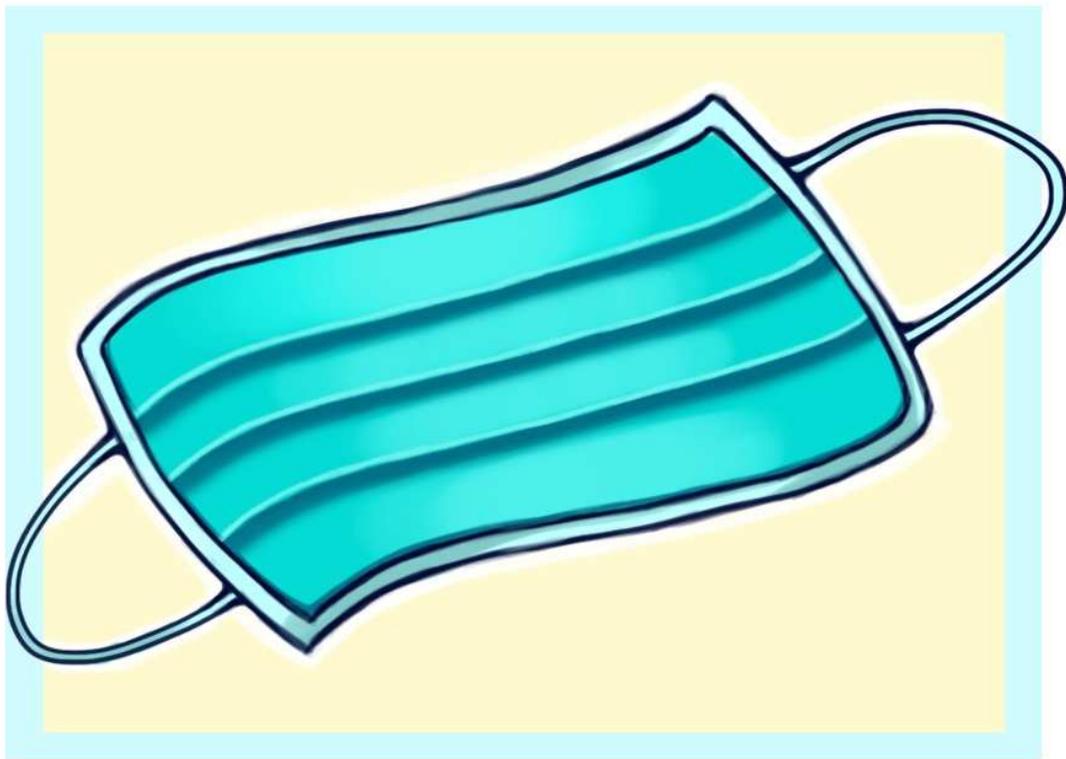
Lungs are a vital organ and the main organ involved in breathing



Lungs are full of tiny air sacs called alveoli. Oxygen from the air you breathe enters the blood through the surface of alveoli by a process called diffusion. Severe COVID-19 can cause lung damage which can affect the body's ability to take in oxygen from the air. Hypoxemia (low oxygen) can cause further damage to your body.

M is for Mask

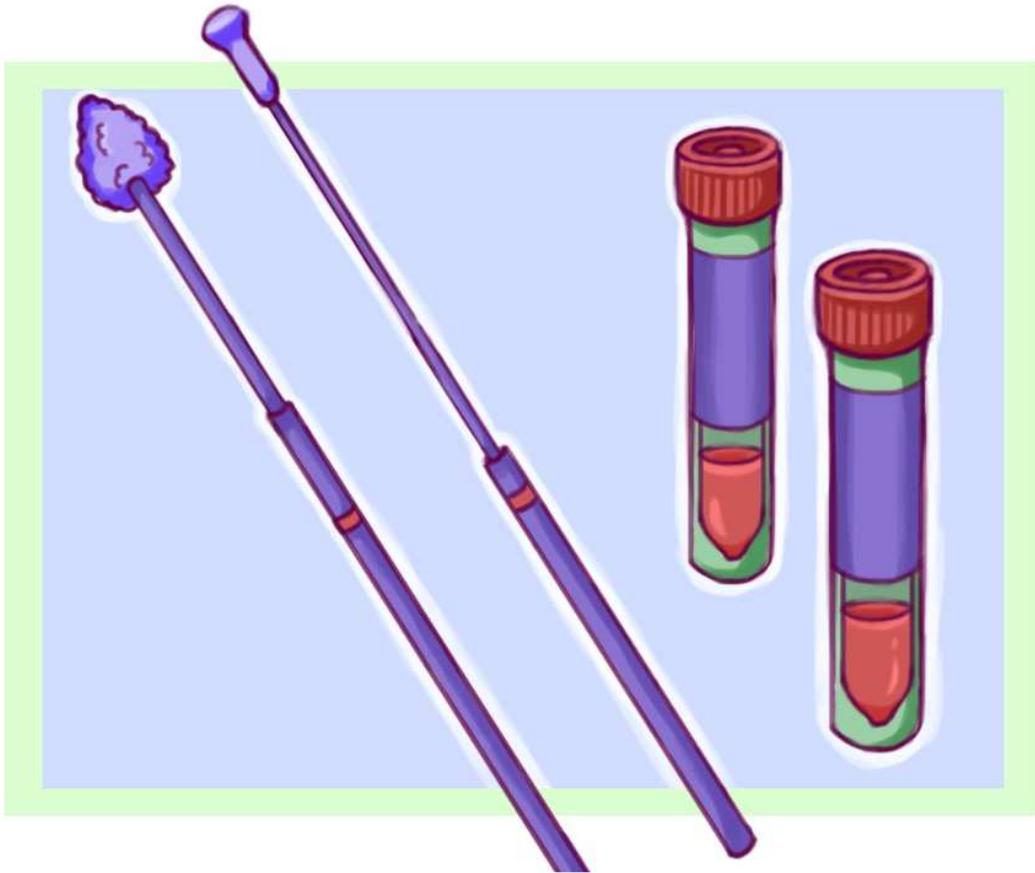
A mask is a covering worn over the nose and mouth



Many countries made masks mandatory in situations where social distancing is not possible. Masks can reduce the spread of infectious diseases, such as COVID-19, by acting as a barrier to the virus transmitted in an infected person's nasal mucus and saliva.

N is for Nasopharyngeal Swab

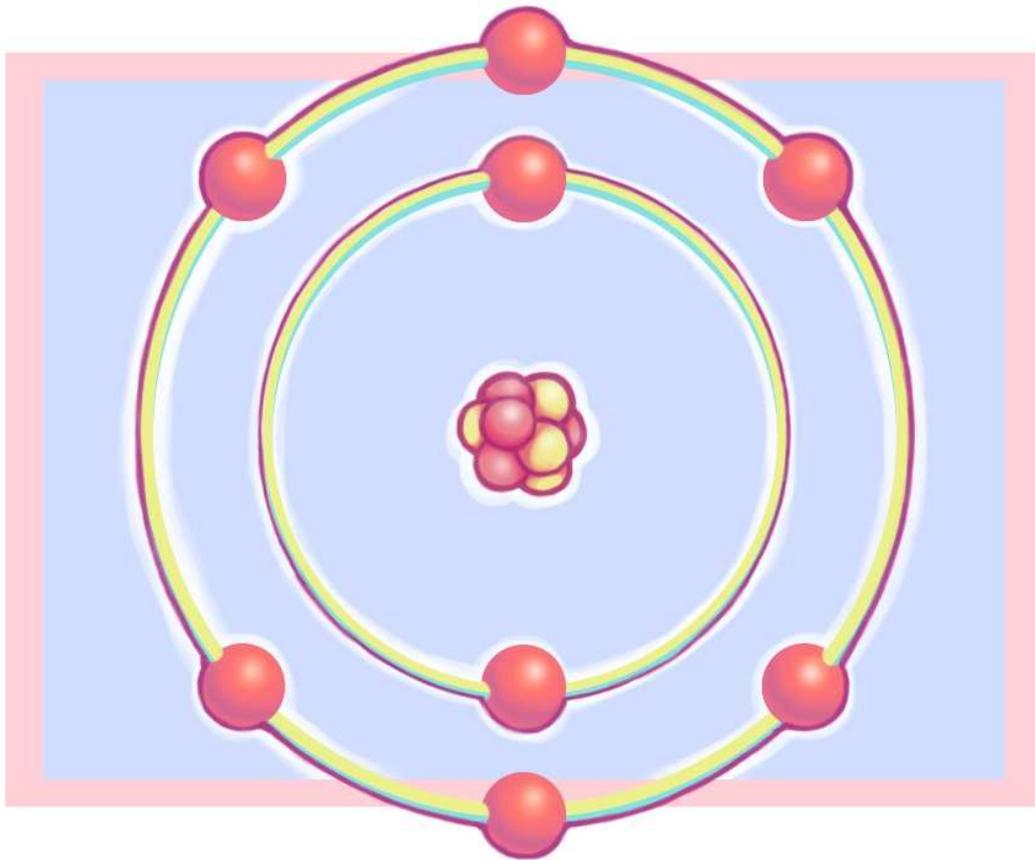
A nasopharyngeal swab can be used to collect a sample in order to test for COVID-19



To test for COVID-19, a swab is inserted into the nasal passage in order to collect a sample which would contain evidence of the virus in a person who has the infection. These swabs are then analysed in a laboratory to confirm a diagnosis of COVID-19.

O is for Oxygen

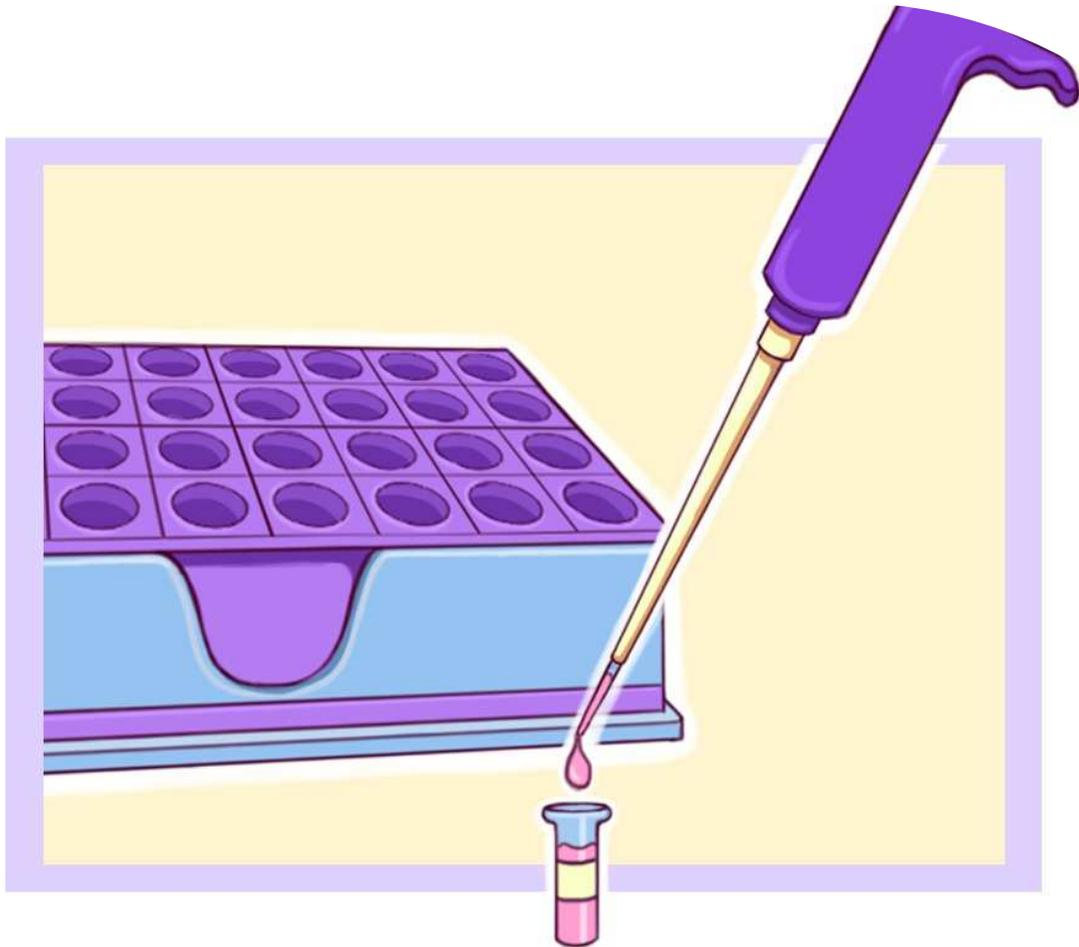
Oxygen is a gas which the body uses in respiration



Oxygen is an element which makes up around 21% of the air we breathe. Air is inhaled into the lungs where oxygen enters the blood through a process called diffusion. Some people who develop a severe form of COVID-19 need extra help to take oxygen into their body. Continuous positive airway pressure (CPAP) machines and ventilators can be used to support the sickest patients whilst their bodies fight the infection.

P is for Polymerase Chain Reaction

A PCR test can confirm whether a person currently has COVID-19



Once a person has had a nasopharyngeal swab taken, the sample can be sent to a laboratory where a polymerase chain reaction test is carried out. A PCR test can detect a virus' RNA (its genetic material).

Q is for Quarantine

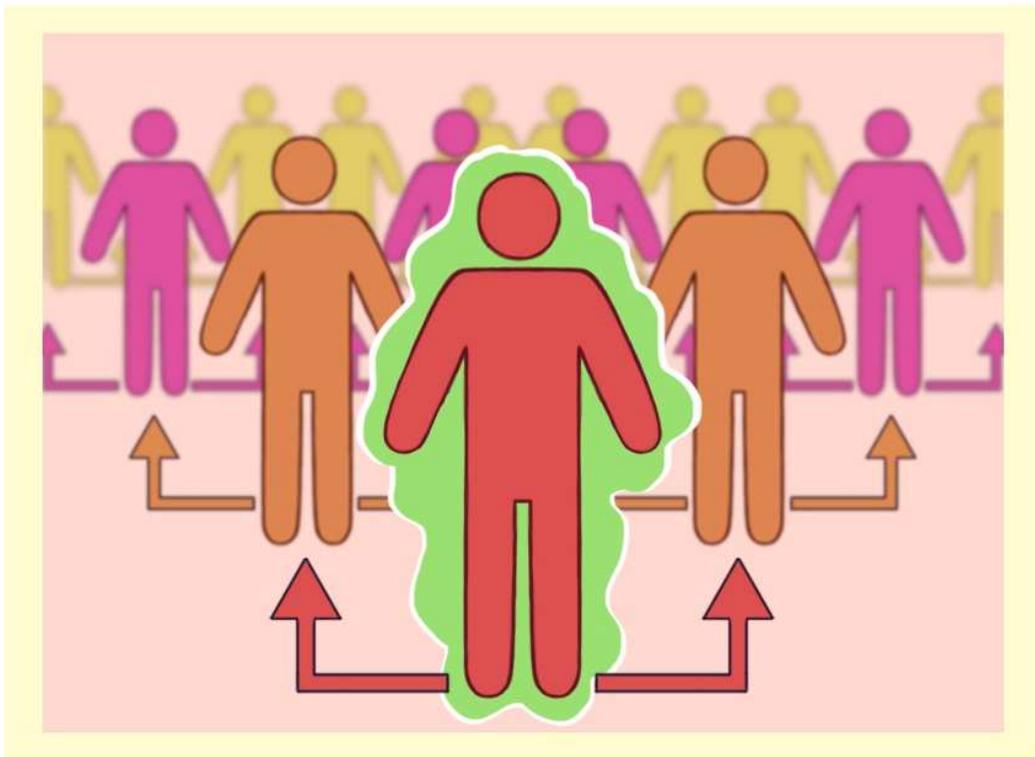
Quarantine aims to reduce the spread of an illness by keeping people separate



A virus such as SARS CoV-2 cannot survive outside the human body for very long. By keeping people separate, the virus' spread can be slowed as fewer people will be mixing and will therefore be less likely to spread the disease if they are infected.

R is for Reproductive Value

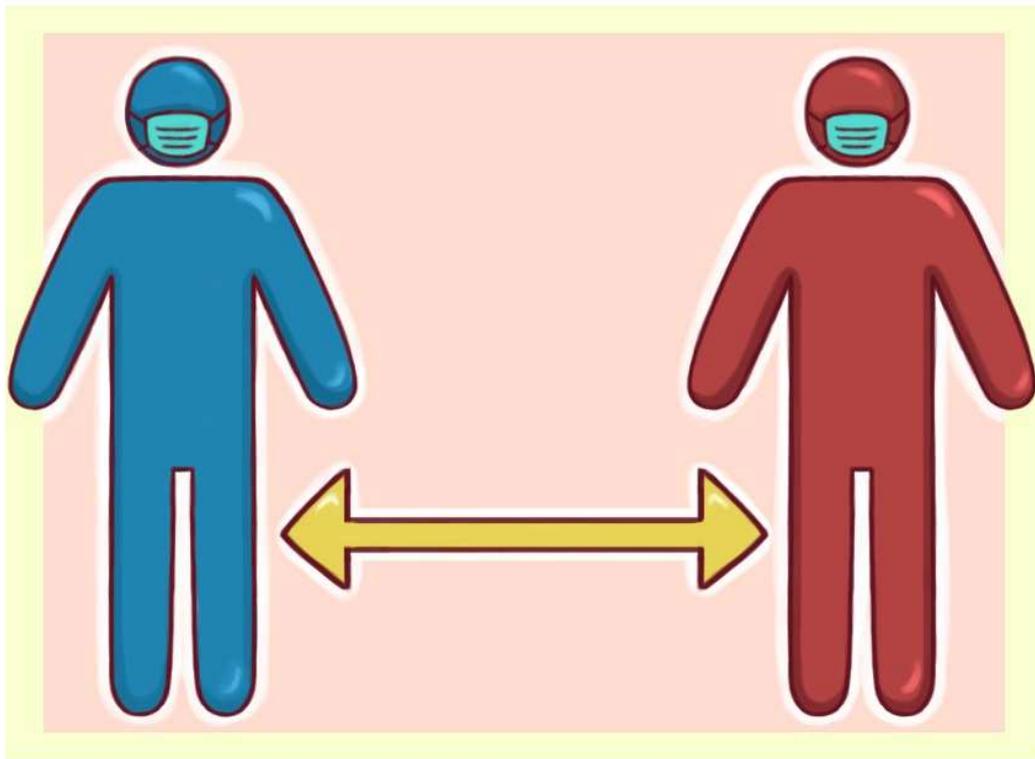
Reproductive Value refers to how many people will catch a disease from one infected person



A disease's reproductive value is determined by how contagious the disease is, the proportion of the population that have immunity and social measures in place, such as social distancing, to limit the disease's spread. Ideally, a disease's R value will be less than one, as this means that not every infected person will pass the disease on. With social measures in place, each infected person will pass the disease to fewer people, slowing the spread and, therefore, lowering the reproductive value.

S is for Social Distancing

Social distancing is the practice of keeping a physical distance from other people



Social distancing can reduce the spread of COVID-19 as it lessens the likelihood a person will contract a disease from an infected person. Staying at least 2 metres from other people will reduce the contact an individual has with airborne droplets of saliva which may contain the virus.

T is for Trials

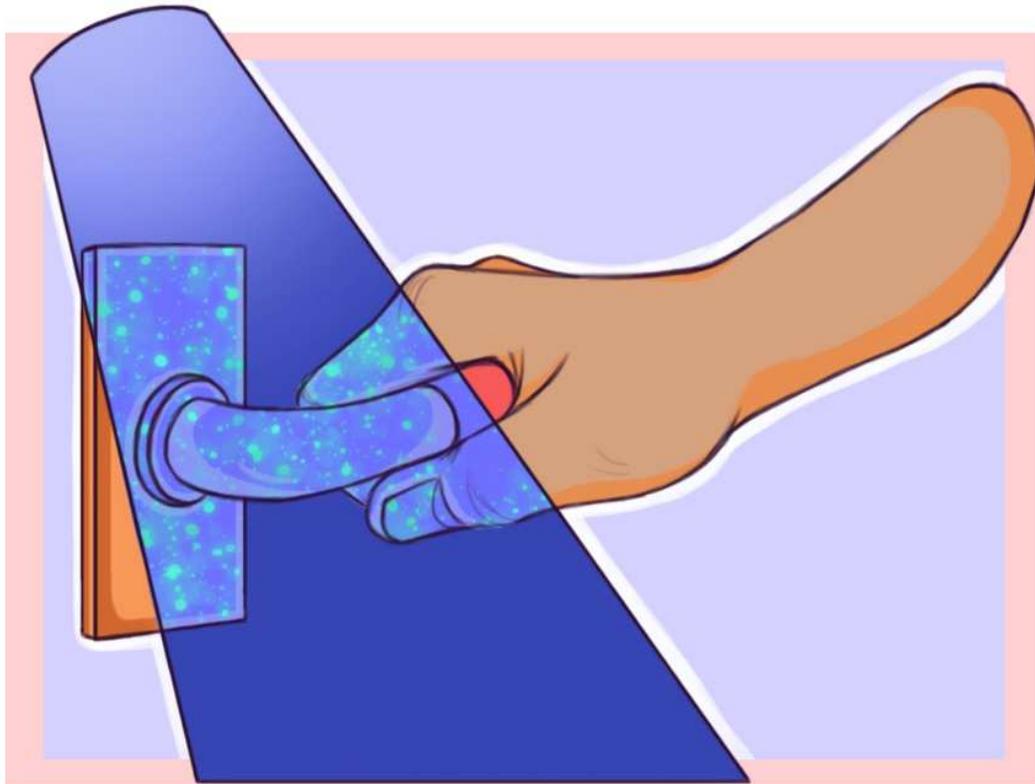
Clinical trials are scientific studies which aim to compare one medical treatment with another



Clinical trials are used to study the effectiveness of new or existing medical treatments. To avoid introducing bias into the study, participants in trials are randomly allocated to which treatment they will be given. During the early period of the pandemic, many studies made claims of drugs being an effective treatment for COVID-19, but without randomisation this evidence will almost always be biased.

U is for Ultraviolet Light

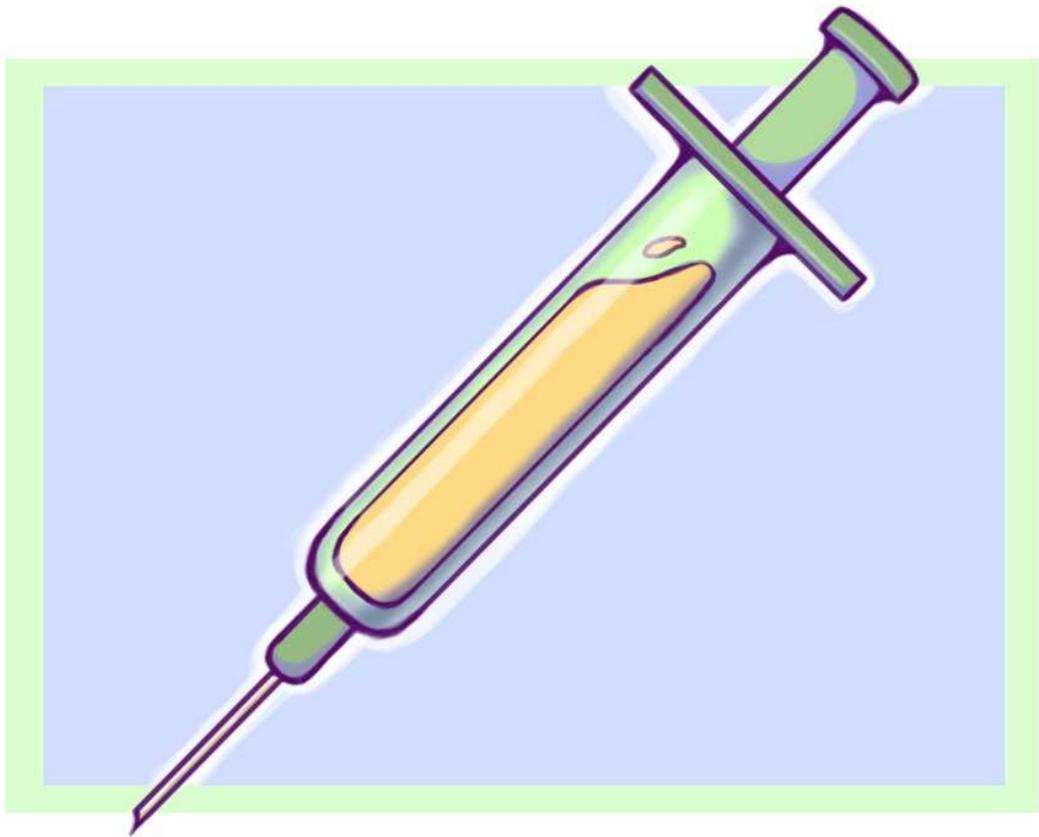
Ultraviolet light is a form of electromagnetic radiation which cannot be seen by the naked eye



Ultraviolet light is often used as a means of killing pathogens. Although the Sun emits UV radiation, it can be dangerous to human skin and eyes. For this reason, we must use adequate sun protection, such as sunscreen, sunglasses and sunhats. When UV light is used to kill pathogens, it must be used at such a high dose that it could be harmful to people. For this reason, using UV light to kill SARS-CoV2 is not something to try at home!

V is for Vaccine

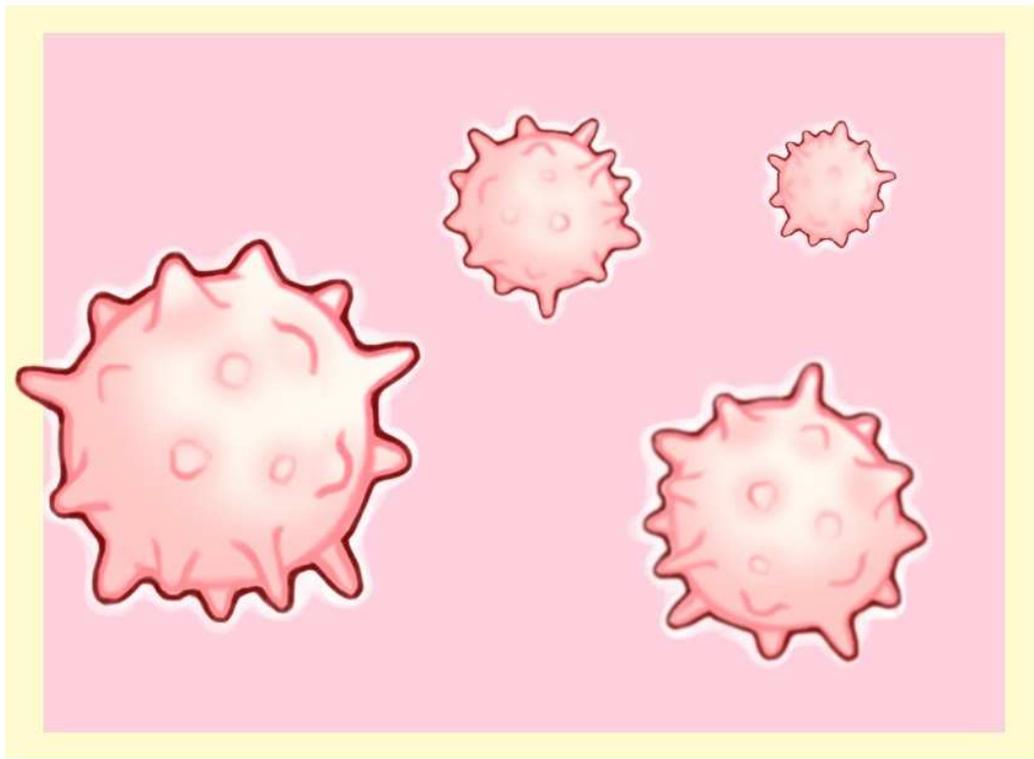
A vaccine is a type of medicine that can prevent someone from catching a disease



Vaccines exist for many diseases, caused by both viruses and bacteria. Once the SARS CoV-2 virus was discovered, teams of scientists across the world started to work on developing an effective vaccine. An effective vaccine against SARS CoV-2 would be safe for people to use and would teach the body to fight off the virus without becoming ill or contagious.

W is for White Blood Cells

White blood cells are an important part of the immune system which help to fight infection



There are different types of white blood cell, each of which work in different ways to fight infection. B cells and T cells are types of white blood cell. B cells, or B lymphocytes, mature in the body's bone marrow and work by secreting antibodies which attach to invading antigens. T cells, or T lymphocytes, mature in the thymus gland. Helper T cells stimulate B cells to produce antibodies against an invading pathogen whereas killer T cells destroy infected cells.

X is for X-ray

An X-ray is an image taken of a person's insides



X-rays can be useful tools in the diagnosis of COVID-19 as they enable doctors to assess the extent of damage to a patient's lungs. Other forms of imaging, such as computerised tomography (CT) scans can also be used to detect changes in a patient's body in response to having COVID-19.

Y is for YOU!

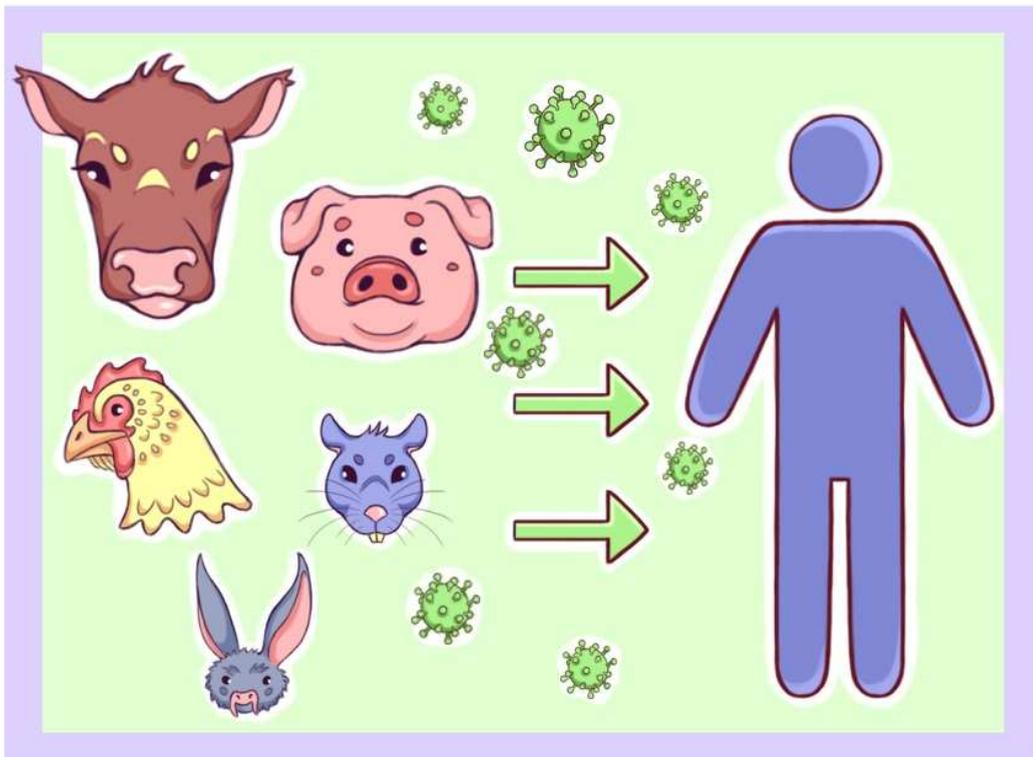
You play an important role in the fight against
COVID-19



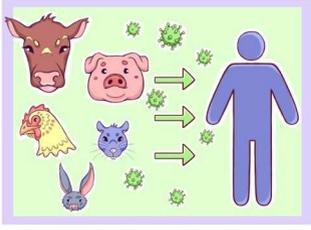
Your actions contribute to preventing the spread of COVID-19. Everyone has a responsibility to act in ways which prevent the disease from spreading. Taking measures such as wearing a mask, social distancing and frequent handwashing are all effective in reducing your chances of contracting and passing on COVID-19. Thank you for your hard work!

Z is for Zoonoses

Zoonoses, or zoonotic diseases are diseases which can be passed between animals and humans



Zoonoses are incredibly common. Some of the ways that an animal's pathogens can be contracted by humans is through direct contact with infected animals, through eating contaminated meat or animal by-products, or through vectors such as ticks and mosquitos. Evidence suggests that SARS CoV-2 is likely to be a zoonotic virus, probably originating in bats. It is a possibility that another animal was an intermediary source, meaning the virus spread from bats to another animal and then to humans.



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