Curriculum Links

Safety issues

Potential sensitivity to health issues and personal experiences of COVID-19

KS3 Science Programme of Study (DfE National Curriculum PoS)

Scientific attitudes

- pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review
- evaluate risks

Experimental skills and investigations

- select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent and control variables, where appropriate

KS4 GCSE Science Programme of Study (DfE National Curriculum PoS)

Development of Scientific thinking

- the ways in which methods and theories develop over time
- using a variety of concepts and models to develop scientific explanations and understanding
- appreciating the power and limitations of science and considering ethical issues which may arise
- explaining every day and technological applications of science; evaluating associated personal, social, economic and environmental implications; and making decisions based on the evaluation of evidence and arguments
- recognising the importance of peer review of results and of communication of results to a range of audiences

Experimental skills and strategies

- use scientific theories and explanations to develop hypotheses
- plan experiments to make observations, test hypotheses or explore phenomena

KS4 GCSE Biology subject content (DfE National Curriculum PoS)

Health, disease and the development of medicines

- the relationship between health and disease
- communicable diseases
- viruses as pathogens in animals
- body defences against pathogens and the role of the immune system against disease
- reducing and preventing the spread of infectious diseases in animals
- the process of discovery and development of new medicines
- the impact of lifestyle factors on the incidence of non-communicable diseases

PSHE (DfE National Curriculum PoS)

Health and prevention

- about personal hygiene, germs including viruses, how they are spread, treatment and prevention of infection
- the facts and science relating to immunisation and vaccination

Behaviour Change Theory links

BCT 5.1	Information about health consequences
BCT 5.2	Salience of consequences
BCT 5.3	Information about social and environmental consequences
BCT 9.1	Credible source
BCT 9.2	Pros and cons
BCT 9.3	Comparative imagining of future outcomes

Lesson 1

How Scientists Work

Objectives

At the end of this lesson students should be able to:

- Recognise the role scientists played in the COVID-19 pandemic
- Describe how scientists conduct trials to develop new treatments
- Identify the advantages of taking part in scientific research

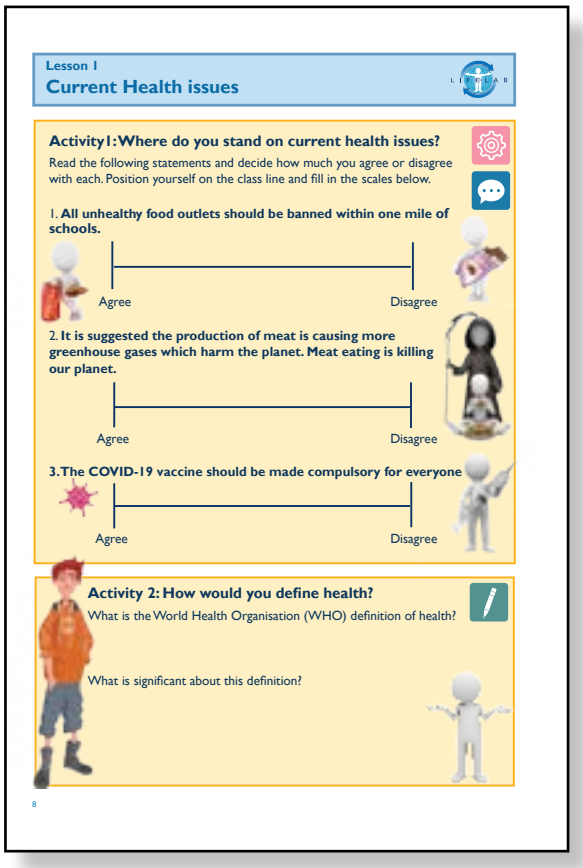
Hook

Watch the video clip from the film Contagion filmed in 2011.

'How many of the terms do you recognise? Should we have been better prepared?'

Activities:

!!This lesson covers some sensitive issues and you may want to discuss these with students at the start, see 'Discussing sensitive issues' in the Teaching Tips on p.12. Introduce the lesson and share the objectives with the students. Individuals record how confident they are for each of the objectives at the start of the lesson.



Starter

Activity 1: Where do you stand on current health issues?

Time: 5 minutes

The belief axis is a discussion tool for exploring the students' ideas on current health issues in the community.

- Mark out an agree/disagree line across the classroom.
- Pick one of the statements and ask the students to position themselves on the line depending on how much they agree or disagree with the statement.
- Class discussion justifying their position and opinions, ***'What is the reason for your position?' What evidence do you have to support your view?' 'Where can we find this kind of evidence?'***
- Students can record their opinion on the scales in the yellow activity 2 box.

Activity 2: How would you define health?

Time: 5 minutes

Students write their own definition for health. Share with students the World Health Organisation's definition '**Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity**.' The World Health Organisation (WHO) is a specialised agency responsible for international public health around the world and advise countries on all areas of health.

Using the powerpoint students compare how well their definition fits with the WHO definition and discuss their results and identify what is significant about the WHO definition. The key point to make is 'Health' is a broad term that covers lots of different things, but the WHO definition is holistic, taking into account mental and social factors, rather than just the symptoms of a disease.

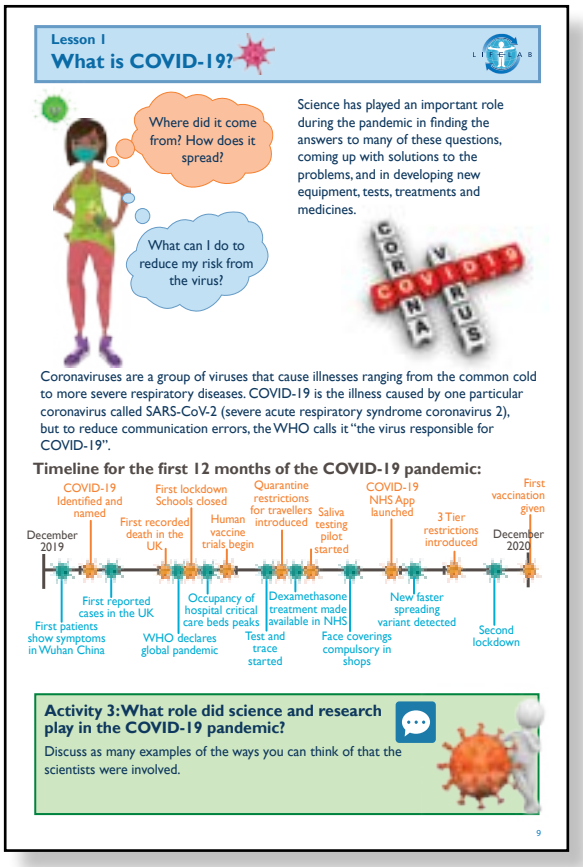
Main

Activity 3: What role did science and research play in the COVID-19 pandemic?

Time: 15 minutes

Science and research has played a vital role in the pandemic. But what actually is COVID-19? Introduce the facts about COVID-19 to the students; there are lots of different coronaviruses that cause illnesses from the common cold to more severe respiratory diseases. COVID-19 is the illness caused by one particular coronavirus which can make some people severely ill. Scientists think it originated in animals, possibly bats or pangolins, and was passed to humans when they came into close contact with the infected animals. These types of diseases are called zoonotic diseases. Because the Sars CoV2 was a new virus, we had no immunity, medicines or vaccines ready to treat it.

Highlighting through scientific research what we know about the virus has dramatically increased throughout the year and we are still learning. Using the PowerPoint explore the timeline of the first 12 months of the COVID-19 pandemic with the students, identifying some of the key ways in which science and research have played a part in the pandemic. By clicking on the different events you will find out more information via the hyperlinks.


Lesson 1
What is COVID-19?

Where did it come from? How does it spread?

What can I do to reduce my risk from the virus?

Science has played an important role during the pandemic in finding the answers to many of these questions, coming up with solutions to the problems, and in developing new equipment, tests, treatments and medicines.

Coronaviruses are a group of viruses that cause illnesses ranging from the common cold to more severe respiratory diseases. COVID-19 is the illness caused by one particular coronavirus called SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), but to reduce communication errors, the WHO calls it "the virus responsible for COVID-19".

Timeline for the first 12 months of the COVID-19 pandemic:

December 2019: First patients show symptoms in Wuhan China
COVID-19 Identified and named
First reported cases in the UK
First recorded death in the UK
First lockdown Schools closed
WHO declares global pandemic
Occupancy of hospital critical care beds peaks
Human vaccine trials begin
Test and trace started
Quarantine restrictions for travellers introduced
Dexamethasone treatment made available in NHS
Saliva testing pilot started
Face coverings compulsory in shops
COVID-19 NHS App launched
New faster spreading variant detected
3 Tier restrictions introduced
Second lockdown
First vaccination given
December 2020

Activity 3: What role did science and research play in the COVID-19 pandemic?
Discuss as many examples of the ways you can think of that the scientists were involved.

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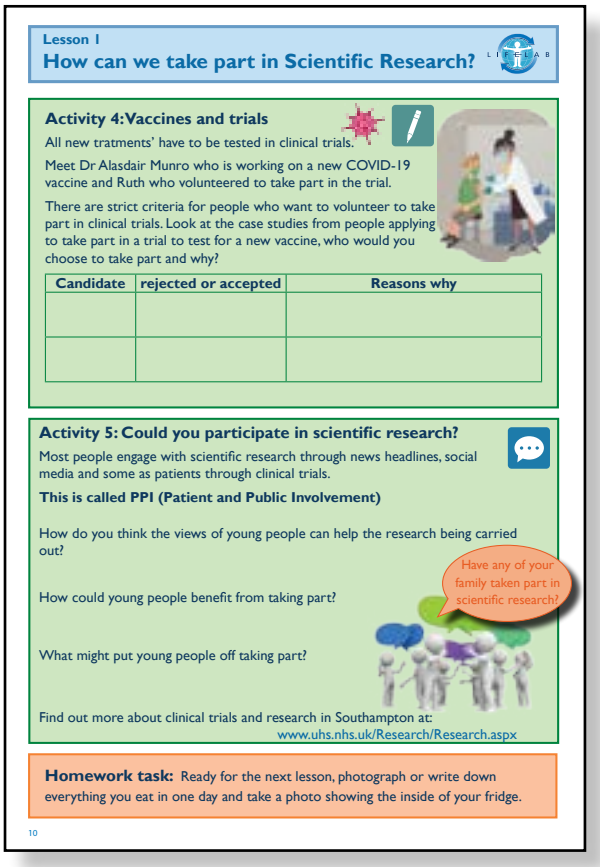
Lesson 1
How can we take part in Scientific Research?

Activity 4: Vaccines and trials
All new tratments' have to be tested in clinical trials.
Meet Dr Alasdair Munro who is working on a new COVID-19 vaccine and Ruth who volunteered to take part in the trial.
There are strict criteria for people who want to volunteer to take part in clinical trials. Look at the case studies from people applying to take part in a trial to test for a new vaccine, who would you choose to take part and why?

Candidate	rejected or accepted	Reasons why

Activity 5: Could you participate in scientific research?
Most people engage with scientific research through news headlines, social media and some as patients through clinical trials.
This is called PPI (Patient and Public Involvement)

How do you think the views of young people can help the research being carried out?

How could young people benefit from taking part?

What might put young people off taking part?

Have any of your family taken part in scientific research?

Find out more about clinical trials and research in Southampton at: www.uhs.nhs.uk/Research/Research.aspx

Homework task: Ready for the next lesson, photograph or write down everything you eat in one day and take a photo showing the inside of your fridge.

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Main

Introduce students to vaccines and the role they can play in the pandemic.
Normally developing a vaccine is a slow process, taking around 10 years to completely develop a new vaccine from scratch. The COVID-19 vaccine was able to be developed in 10 months because there was previous research available from past viral outbreaks, governments around the world pledged funding and scientists collaborated globally to make it happen. The trial phases and manufacturing happened simultaneously, which would normally take years and happen one after the other. There has been as much data collected as in any other trials, so safety hasn't been compromised.

Main

Activity 4: How do we develop new vaccines?

Time: 25 minutes

All new treatments and medicines have to be tested in clinical trials and there are strict criteria for people who want to volunteer to take part in any trial. Using the new Oxford-AstraZeneca COVID-19 vaccine as a case study, watch the short video clips to meet Dr Alasdair Munro who is working on a new COVID-19 vaccine and Ruth who, volunteered to take part as a participant for the new vaccine trials, to find more about their role in developing the new Oxford-AstraZeneca vaccine.

There are strict citeria for people who want to volunteer to take part in any clinical trials. Students imagine they are part of the selection team and it's their job to identify who is and isn't suitable to take part in the trial. Using the evidence from the completed questionnaires from people applying to take part in the vaccine trial, and the information sheet about the trial, students assess and select who they would reject or include in the trial and explain their reasons why.

Plenary

Activity 5: Could you participate in scientific research?

Time: 5 minutes

Introducing students to Patient and Public Involvement (PPI). Discuss:
'How would you feel about taking part in a scientific research study?'
'How do you think the views of young people can help?'
'What are the benefits to young people taking part?'
'What might put people off from taking part?'
'Would you take part?'
PPI is very important to research, most funders will not fund projects unless they can see how the views and input of patients and the public will be included. The hospital and university are always looking for people who want to help shape research (students, families, teachers). The link for more information on clinical trials and research at Southampton is: www.uhs.nhs.uk/Research/Research.aspx

If time allows revist the belief axis stament in Activity 1 and see if the students have changed their view points. Students refer back to the lesson objectives and complete the assessment for learning activity in the orange boxes, feedback and share an interesting fact they have found out from the lesson.

Homework

In preparation for the next lesson ask students to record everything they eat for one day, either written or photograph. Potential here for parental participation and involvement, considering the diet of the family.

Resources

- Lesson 1 PowerPoint slides
- Student booklet pages 7-10
- Case studies of potential vaccine trial participants

Keywords

- virus
- pandemic
- zoonotic
- vaccine
- clinical trial