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Kit №8

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Science Debate Kit: Vaccinations

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Debate Kit: Vaccinations

Should children be required to have all their vaccinations before they can go to school?

A structured practice debate on a controversial topic. The different 'rounds' of the debate help students think through the issues and reconsider their opinions. The structure also shows them how to build a discussion and back up their opinions with facts.

You can use all eight characters, or fewer, as you wish.

The minimum is the four essential characters (**in bold**), this gives two for and two against.

Characters

Yes - vaccines should be compulsory to attend school	No - vaccines shouldn't be compulsory to attend school
• **Henry Sparrow – Nurse**	• **Martha Guard – Community health visitor**
• **Hasmita Myska – Parent**	• **Flora Eccrington – Author**
• Polly Jones – Philosopher	• Ethan Groves – Anti-vaccination activist
• Steve Bridgeford – Parent	• Tim Lawrence – Unvaccinated teenager

Facilitation tips

Ensure pupils know there is no right or wrong answer. Be observant of those who want to speak and are not getting a chance. Encourage students to give a reason for their opinions.

Designed for 11 years and up

For groups who may need extra support you can put the following prompt sentences upon the board:

"I think we should/shouldn't make vaccinations compulsory because..."

"I think …… is the most important point to think about."

Learning notes

Learning objectives:

- To practise discussing and debating issues and expressing an opinion.
- Understand more of the technical, social and ethical issues around vaccinations.

Other learning outcomes:

- Consider social, ethical and factual issues in an integrated way.
- Think about different points of view.
- Learn to back up opinions with facts.

Curriculum points covered:

Working scientifically
- Societal aspects of scientific evidence.
- Developing an argument.

Substantive
- Learn how vaccines work.
- Learn how our bodies protect themselves against infection.

Debate

Ethan Groves – Anti-vaccination activist

I'm doubtful about the safety of vaccines, especially MMR. I don't believe what doctors and scientists are saying now. They can't be SURE it won't cause a problem, so why take the risk? I'd rather let my kids take their chances with catching the infection. I had measles when I was a kid and I was fine. It's probably better for their immune system to fight things off themselves.

Fact: In 1955, 200,000 children in the USA were mistakenly given a polio vaccine when the virus hadn't properly been inactivated. 10 of them died and 200 were paralysed.

Issue: It should be your choice whether to have something done to your body, or your child's body.

Question: If there is any risk at all to having a vaccine, then shouldn't we have a choice of whether to take it?

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Debate

Flora Eccrington – Author

I'm writing a book about smallpox, an infection that could kill 80% of infected children. The earliest attempts to immunise against it were called variolation. In 15th Century China they would blow powdered smallpox scabs up people's noses! 18th Century vaccines based on cowpox were safer but even so, some people were opposed to them.

Fact: In 1853 the British government made smallpox vaccinations compulsory for children and many people objected. There were anti-vaccination riots in several cities.

Issue: It's wrong to try to force people to do things, and it often backfires, making them more determined not to do it.

Question: Why try to force people to do something, when you could work with them, and try to persuade them instead?

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Debate

Steve Bridgeford – Parent

When my daughter Anna was a baby, I lost my job. The company I worked for went bankrupt. I didn't get the pay they owed me, we couldn't pay our mortgage. In all that stress, we forgot Anna's routine injections. Shortly after she started school she got Meningitis C. She nearly died, and was left with brain damage and hearing problems. If she had to have her vaccines before starting school, we would have had her vaccinated!

Fact: There are different types of meningitis, and three vaccines help protect us against different types - Hib, MenC and pneumococcal. They are all given to babies in their first year of life and protect them for many years.

Issue: I think the child's right to be vaccinated should be the most important thing.

Question: Shouldn't we as a society be protecting children from forgetful parents, or parents who don't agree with vaccines, by making vaccinations compulsory in order to go to school?

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Debate

Hasmita Myska – Parent

My beautiful boy has leukaemia, a sort of cancer. He's having chemotherapy and hopefully he will make a full recovery. But the treatment suppresses his immune system so he can't have any live vaccines, like MMR, until he's better. There are some unvaccinated children at his primary school. I'm terrified he's going to catch measles from an unvaccinated child and die from that, and there's nothing I can do to protect him.

Fact: There will always be some people who can't have a vaccine for medical reasons. But if enough other people are vaccinated, the infection can't spread, so everyone is protected. This is called herd immunity.

Issue: Herd immunity depends on high numbers of people being vaccinated. I think we SHOULD restrict people's freedom if they are putting others at risk. Just like it's illegal to drink and drive.

Question: My child has no choice, he can't be vaccinated. Why do other parents have the right to put my child at risk?

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Debate

Polly Jones – Philosopher

I study moral questions to do with health and medicine. I believe vaccinations should be compulsory. If enough people are vaccinated then EVERYONE benefits from herd immunity. So I think it's only fair that everyone should take part (unless there are medical reasons why they can't).

Fact: Some vaccines have to be 'live' vaccines to work (this includes measles, mumps, rubella and the new flu vaccines being given to children as a nasal spray). That means they give you a very weak form of the infection and could make you a bit ill.

Issue: People who choose not to vaccinate know that if everyone else DOES vaccinate, their children are probably still safe. So they are freeloaders!

Question: Why should some people benefit without the inconvenience or risk (however small) of getting the vaccine?

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Debate

Henry Sparrow - Nurse

I love vaccines! My Dad caught polio as a child and it left him paralysed in one leg for life. It really affected him. Yet it could have been prevented with one little vaccine. When I give kids jabs I tell them I'm giving them a super-power, making them immune to an infection. I think it's a miracle. I think we should do everything we can to make more children protected.

Fact: If a child is old enough to understand and make their own decisions, a doctor or nurse can give the child medical treatment, whether their parents agree or not. GPs or nurses can always give 'catch-up' immunisations if they are asked.

Issue: Compulsory vaccination to go to school would be one extra push towards all kids being immunised. If it saves just one child from a horrible illness then I think it's worth it.

Question: If modern medicine CAN protect children against dangerous infections, shouldn't we do everything to make sure it DOES?

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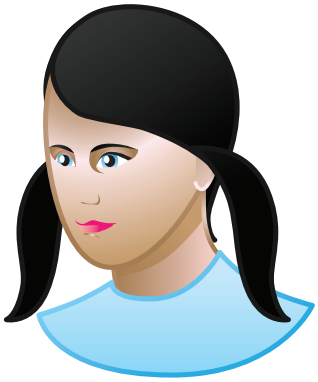
Debate



Martha Guard – Community health visitor

I'm a health visitor in a big city. I visit new mums and try to help make sure their babies are safe and healthy. Some of the mums I visit have lots of problems – mental health issues, poverty, violent partners or ex partners. Some of them don't speak good English.It is hard for some families to access services.

Fact: In a 2006 study, roughly 3% of 9 month old babies had missed SOME of their immunisations. They were generally from disadvantaged families. In the same study roughly 1% were NOT IMMUNISED AT ALL, and generally they were from more well off families who objected to immunisations.

Issue: Most of the kids who miss immunisations, it's just because their families are struggling and have problems.

Question: Just because children haven't received all their vaccines doesn't mean they shouldn't attend school. What good will it do to punish people who are already struggling?

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Debate

Tim Lawrence – Unvaccinated teenager

I didn't have the MMR jab because my parents worried about autism. Since then science has shown the vaccine is safe. But my dad is convinced vaccines aren't safe. I want to go to school, but I might not be able to if they change the law.

Fact: Andrew Wakefield did a study in 1998 that seemed to show a link between the MMR jab and autism. He has since been struck off by the General Medical Council for dishonesty and banned from ever working again as a doctor in the UK. Investigation has shown that his research was deeply flawed.

Issue: Every child should have the opportunity to get an education. Vaccines should not be compulsory in order to attend schools.

Question: Why give unvaccinated children MORE problems?

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Vaccinations

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The kit has been produced by the I'm a Scientist team and funded by e-Bug, a project operated by Public Health England. Ireland distribution funded by Science Foundation Ireland.

Kit Nº 8

Teacher Notes

Question: Should children be required to have all their vaccinations before they can go to school?

This is not a debate on whether vaccines are safe or a good idea. Plenty of resources on that topic exist already, and the science comes down heavily on the side of vaccines being safer than catching communicable diseases. This debate is about what the best public health policy is, to protect the public, balancing individual freedoms against public health. This leads to a more finely-balanced debate.

Lesson plan

The different 'rounds' of the debate help students think through the issues and reconsider their opinions. The structure also shows them how to build a discussion and back up their opinions with facts.

Starter: 5 minutes.
Do your students know what vaccinations are?
What vaccinations do children usually have and at what ages?
What vaccinations have the students in the class had or not had? Do they know how vaccines work?

Do students already have an opinion on whether having your vaccines up-to-date should be compulsory to go to school? Ask their opinion and fill in the first question on the online survey (debate.imascientist.org.uk/vaccinations/)

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Main Activity: 35 minutes.

1) **Split students** into as many **groups** as characters you want to cover.
2) **Give** them their character cards – one per group, and give them a few minutes to read them over.
3) Get one student in each group to **read out** their **first section** to the rest of the class.
   What are the class's initial thoughts? Is there one position they identify with or reject?
4) Take it in turns to **read out** their **fact**. Does it change the way they think?
5) **Read** the **issue**. Any different feelings?
6) Each group **asks** their **question to** the **character of their choice**.

Plenary: 10 minutes
Now that students have had the debate and heard many different opinions on the topic of vaccines, what is their own opinion? Have they changed their minds? Why?

Vote for which position they agree with most (if there is one). Fill in the third question of the **online survey.**

Background notes

Current policy
In the UK and Ireland, no vaccines are required for children to attend school. In other countries (e.g. USA and Canada) a full set of vaccines is required for children to attend school. Despite this, the vaccination rates in these countries are comparable. For example, the numbers of children who'd had the MMR vaccine in 2013 are similar in the UK and USA – 92.3% vs. 91.9% respectively.

Vaccines are biological preparations that induce immunity to a particular infection. Infectious agents can be viruses, bacteria or parasites. Vaccines are the product, and immunisation is the result.

If you recover from a natural infection your body has learned to recognise the pathogen and fight it. You have made antibodies that recognise part of the pathogen (called an **antigen**). Once you recover from the infection, you will usually have small numbers of the antibody in your body forever, as well as immune system cells that are programmed to fight the infection. If you encounter the same infection again, your body can quickly mount an immune response, without you having to get ill first. This is called **naturally acquired immunity.**

Vaccination is a way of giving you that antibody and immunity, WITHOUT you having a full blown infection. There are different ways of doing this:

Live, attenuated vaccines – the patient is given a weaker version of the pathogen. They still get an infection, but this is very mild or not noticed at all, and their body will mount an immune response. e.g. MMR and rotavirus vaccines.

Inactivated/killed vaccines – the patient receives a pathogen which has been killed, but still has the antigen bits. e.g. polio (IPV), pertussis/whooping cough and hepatitis A vaccines.

Toxoid vaccines – contain an inactivated toxin, for bacterial infections where a toxin produced by the bacteria is the main cause of the illness. e.g. diphtheria, tetanus.

Subunit/conjugate vaccines – contain only broken up bits of the pathogen (i.e. antigens), which scientists have found our bodies are good at responding to. They may contain between 1 and 20 different antigens. e.g. influenza (the flu jab) and pneumococcal vaccines.

Vectored vaccines – sometimes we use one virus that is safe to deliver fragments of another virus to the immune system. This is useful if the target virus is dangerous and difficult to work with. The vaccines being tested for controlling the Ebola outbreak in West Africa are like this.

History of vaccines
Most people say the first vaccine was given by Jenner using cowpox to inoculate against smallpox. In fact, dairy farmers had long noticed that people who'd had cowpox didn't get smallpox. Benjamin Jesty, a Dorset farmer, successfully vaccinated his wife and children against smallpox using cowpox pus in 1774!

But even these weren't the earliest inoculations against smallpox. Various forms of 'variolation' were used in China and the Middle East, centuries earlier. These included blowing powdered smallpox scabs up people's noses, or rubbing material from smallpox patients into cuts in people's arms.

Variolation was common in China, the Middle East and Africa by the 17th Century, although it was regarded as 'superstitious folklore' by many European doctors. Yet it was the most effective way of protecting against smallpox. Eventually vaccinations were introduced in Europe in the early 18th Century.

Later, in 1796, Jenner used pus from cowpox blisters to inoculate a young boy. He then demonstrated the boy and other people he had inoculated were immune to smallpox. He wrote up his findings in a scientific paper. By 1807 the Royal College of Physicians had confirmed that vaccination worked.

By 1980 smallpox had been eradicated from the world by widespread vaccination. The only known remaining smallpox viruses in the world are held in two laboratories – one in the

USA and one in Russia. Although a forgotten ampoule of smallpox virus was recently found in a laboratory fridge in Maryland. Experts think it's possible there are also other stocks elsewhere.

Back in 1853, when smallpox was rife, vaccination was made compulsory by the Vaccination Act. Even though at that time smallpox killed up to 80% of infected infants, there was opposition to the compulsory vaccine. People worried about the safety of the vaccine and they were suspicious of having to do things to their bodies because of the law. There were riots in Ipswich, Henley, Mitford and other towns. This anti-vaccination movement still exists in some places today.

The influence of the media on vaccination rates

The MMR scare began in the UK in 1998 with a paper (now-discredited and retracted) in The Lancet by Andrew Wakefield. The paper suggested there were side effects with the vaccine causing an unusual gut syndrome that could be linked to autism. The findings of this very small (and, as we now know, flawed) study were trumpeted by much of the press, without giving time for scientists to investigate or respond.

MMR vaccination rates plummeted, leading to outbreaks of measles, which have continued in young adults. Since then every piece of evidence supports the idea that the MMR vaccine is completely safe, and increasingly, the public have realised this. Following much more favourable press coverage and campaigns to increase vaccination, MMR vaccination rates are now at a historic high (92.7% of infants in 2014 had it by age 2, the lowest recorded figure was 79.9% in 2003-4). You may have pupils who were not vaccinated due to the controversy, and who have never caught up.

Catch-up vaccinations

It is straightforward to get catch-up vaccinations at any age from your GP. Usually young people would be accompanied by a parent. But if their parents disagree and a young person wants to be vaccinated, then they can be treated without parental consent, if the doctor or nurse judges them to be 'Gillick competent'. i.e., in their opinion, the young person understands the treatment they are asking for and can give informed consent. This would almost certainly be the case for a 13 year old or older, asking for catch-up vaccinations.

All the facts in this kit have been researched. References can be found online at: (debate.imascientist.org.uk/vaccinations/)

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