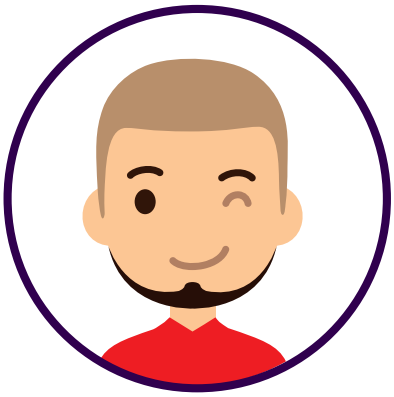
I'm a Scientist Get me out of here

Food Hygiene

e-Bug

SAFE CONSUME

Nick 'nameless' Slevish - DJ



I work as a DJ for weddings and all kinds of functions, and believe me, I've seen some parties! Buffets often have terrible hygiene, and I'm sure some hotel staff don't care at all about food safety. They often aren't very polite to me, and I'm the star of the show! The buffet at my cousin's wedding made everyone ill. Whereas my mum, bless her, taught me to cook, and I've never been ill from it.

Fact: *Bacillus cereus* bacteria can be found on rice. The spores are not destroyed by cooking, so if cooked rice is left at room temperature for a few hours, *B. cereus* can grow on it, and make people ill when they eat it. Heating the rice before serving won't help. The bacteria is thermoresistant.

Issue: My mum always ate food right after cooking, or chilled it and put it straight in the fridge. She knew how to cook properly.

Question: Do you keep food sitting around for hours after cooking it, like at a buffet? Or do you eat food at home immediately after cooking?

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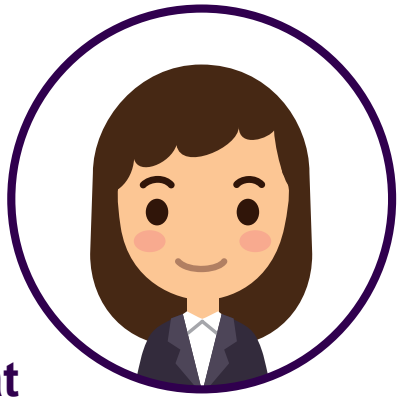
Petya Todorova - Health visitor



Part of my job is to visit new parents at home, when their baby is young, and check everything is going OK. New babies' immune systems are still developing, so I am very careful about washing my hands at the start of each visit. I've really started to notice that hardly anyone washes their hands enough. Often people don't have soap or a towel by the sink in the bathroom - how can they possibly have clean hands?

Fact: Hygiene experts recommend washing hands several times a day, particularly: after arriving at school/work, after getting home from school/work, after using the toilet, before cooking, after handling raw meat and before eating.

Issue: Many viruses, like *Norovirus*, and bacteria such as *Salmonella*, can be spread by touching hands and surfaces if people don't wash their hands enough.

Question: When do you wash your hands during the day?

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Dan Murray - Festival food seller

I sell basic food - chips, burgers, sausages - at festivals and fairs. People come to me when they've been out all day, eating picnics, drinking, dancing, going on fairground rides, using portaloos, all sorts! Then they come back the next day complaining that they've been sick and my food made them ill. Or maybe it could have been anything else they did all day, in fact all week?

Fact: *Campylobacter's* incubation period - the time it takes from eating infected food to being ill - is 2 to 5 days. *Listeria* usually takes about 30 days.

Issue: Most foodborne illnesses take a few days or weeks to make you ill, so people tend to think of the 'unusual' food they've eaten out in that time, and not the normal everyday food they've cooked at home.

Question: Can you think of everything you've eaten in the last 30 days? How much of it was out at a restaurant?

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Gus Farthing-Wood - Cookbook writer

In my cooking I focus on fresh, local produce. A lot of my veg is grown on our own smallholding, so it will be picked that morning and eaten that lunchtime. But most restaurants are not serving food that fresh. Food may be part-cooked and then waiting around for hours or days.

Fact: At a little warmer than room temperature, many bacteria can double in about 30 minutes. That means that one bacterium can become a million bacteria in about 10 hours.

Issue: Food is healthiest, tastiest and best for the planet when it's fresh, local and in season.

Question: I know catering staff have to pass exams, but there's a driving test to drive a car, but it doesn't mean everyone obeys the law on the road. Do you think restaurant staff never cut corners?

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Hilda Guard - Chicken keeper

I keep chickens in my back garden.
I love their little friendly clucks and squeaks.
I look after my chickens really well, keep them clean, and they've been vaccinated against *Salmonella*.
Every morning I eat scrambled eggs on toast made with eggs laid that morning. Delicious!

Fact: Up to 0.16% of UK laying flocks are infected with *Salmonella*.

Issue: Caterers will often mix all the eggs up in a big bowl - so even if only one was infected with *Salmonella*, now they all are! It's a risk, especially if the raw egg isn't cooked immediately.

Question: Which do you think caterers care most about, the health of their customers, or just getting the food cooked and served in the most efficient way?

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Henri Fournier - Chef

I have been working in kitchens for 20 years. I love food, and cooking is my passion! I have spent £100,000 kitting out my restaurant kitchen. Believe me, I know all about food hygiene and feel confident handling food at work, where I have separate chopping boards and utensils for raw meat and everything set up right. But I will not prepare chicken in a home kitchen, it's just impossible to do it safely.

Fact: Just 500 *Campylobacter* bacteria can make a person ill. That's about 2 picolitres of *Campylobacter*. (A picolitre is a trillionth of a litre). For reference, that is 250,000 times smaller than a poppyseed.

Issue: It only takes a speck of raw chicken, too small to see, landing on your salad or something, to make a person ill with *Campylobacter.*

Question: Do you really trust everyone you know to understand the dangers and be as careful as they need to be when cooking?

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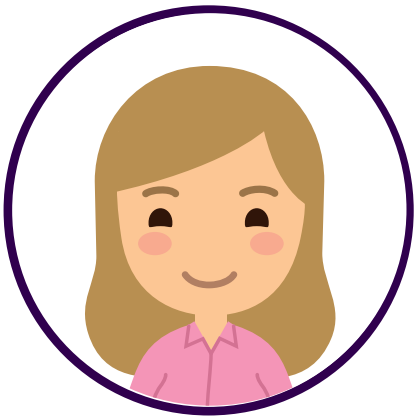
Lauren Quinn - Mother of ill child



My son was born with a disorder which means his immune system doesn't work properly to fight off infections. He can get really ill from infections, including from food, that most people wouldn't be affected by at all. We are super careful about things like handwashing and food hygiene.

Fact: 56% of raw chickens bought in the UK test positive for *Campylobacter* bacteria. This is the most common cause of foodborne illnesses.

Issue: I don't think catering staff can be as careful as me, it's just a job to them.

Question: Do you feel happiest if your health is in your hands and people who love you? Or random strangers for whom it's just a job?

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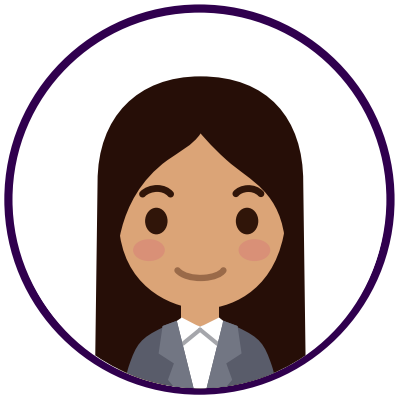
Masuda Chowdhury - Environmental Health Officer



I work for the local council, making sure homes and workplaces are safe, hygienic and healthy. I visit lots of catering businesses each week to check they are clean and following good safety practices. Of course I see a lot more catering businesses than home kitchens - because there are far more checks on catering businesses than on your home kitchen. And a large restaurant or cafe could serve thousands of people a week.

Fact: Everyone working in a catering establishment needs a level 2 food hygiene certificate, and all managers and supervisors need a level 3 certificate.

Issue: Catering establishments are inspected and their staff are trained. There are no controls or checks on people's home kitchens.

Question: Caterers' livelihoods depend on having clean kitchens! If they make people ill they would soon lose all their customers. Don't you think they are motivated to get it right?

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Kit №13

Teacher Notes

***Question:* Is it safer to eat at home or out at a restaurant?**

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.
What do they know about foodborne illnesses? Who's ever had one? What causes food-borne illnesses? Can they name any of the organisms that cause them? (If it fits with your Scheme of Work you might want to do a quick reminder of the difference between viruses and bacteria, although it won't feature in detail in this kit.)

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 turn to **read out** their **fact**. Does it change the way they think?
5) **Read** the **issue**. Any different feelings?
6) Each team **asks** their **question to** the **character of their choice.**

Designed for KS4. These debate kits have been used with ages 11-18.

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Support: To help students you can put the following prompt sentences on the board:
"I think it's safer to eat at home/in a restaurant because..."
"I think ..... is the most important point to think about."

Plenary: 10 minutes
Vote for which position they agree with most (if there is one). Why? Which arguments were most persuasive?

Note – Pupils can stay in roles all the way through debate, or only for the first round if you prefer. If it's all the way through, give them a chance to express their own opinion at the end and in the plenary.

For groups who are not confident at class discussion, it might help to have them start by discussing the question and/or their character's position in pairs, and then compare notes in fours. They've then had chance to rehearse some of what they want to say before having to do it in front of the whole class.

Background notes

This kit has been funded by the European Union's SafeConsume project, which is an EU-wide project to reduce illness caused by foodborne pathogens.

The SafeConsume project focuses particularly on the five pathogens that cause most foodborne illness in Europe: *Campylobacter, Toxoplasma, Salmonella, Norovirus, Listeria.* Between them these five organisms cause about **70%** of the health burdens related to foodborne illness.

Campylobacter
Campylobacter jejuni is a bacteria which naturally lives in chickens and spreads very quickly through flocks. There is no vaccine for it (either for chickens or humans). 56% of raw chicken for sale in UK shops tests positive for *C. jejuni*. As discussed in the kit it can cause illness at very low doses - as little as 500 live bacteria - and therefore it's imperative to:-
- Cook chicken thoroughly
- Be extremely careful when preparing raw chicken. A tiny speck of infected chicken on something that **isn't** going to be cooked - e.g. a salad being prepared nearby - can be enough to cause illness.

Campylobacter has very specific microaerophilic growth requirements. That is, it needs some oxygen, but very low levels. Because of this, scientists didn't work out how to culture it until the mid 1970s. It was first identified in humans in 1947, when it was isolated from the blood of three pregnant women ill in hospital with sepsis. However it's thought that Theodor Escherich (of *Escherichia coli* fame) actually first discovered it in 1886 when he observed spiral bacterium in the colons of young children but could not culture the bacteria.

This growth requirement, means *Campylobacter* won't proliferate on raw chicken or other food. You could leave a piece of raw chicken sitting at room temperature for a week and it would have no more *C. jejuni* on at the end of it. Although we wouldn't advise it, because it could be crawling with *salmonella* or *E. coli* by then…

Toxoplasma
Toxoplasma gondii is a one-celled eukaryote that causes toxoplasmosis. It's an obligate intracellular parasite - meaning it cannot reproduce outside of a host cell. *T. gondii* is able to infect practically all warm-blooded animals. But it's only been shown to sexually reproduce in felines - for example, the domestic cat. Felines are its 'definitive host'. The rest of us (including all other warm-blooded animals) are simply intermediate hosts. It's spread via cat faeces and care must be taken to wash fruit and vegetables thoroughly, especially home grown vegetables.

World-wide, 30-50% of people have been infected with *T. gondii*, and in many cases it causes no or few symptoms. But it can cause miscarriages, birth defects and stillbirths and so is dangerous to pregnant women. It can also cause serious (in some cases fatal) toxoplasmosis in people with weakened immune systems.

Salmonella
Salmonella is a genus of bacteria. There are two main species, with six subspecies and more than 2,500 known strains. These strains, or serotypes, vary a lot in how infectious they are, how easily they spread, and how dangerous they are to humans.

Salmonella species live naturally in chickens, without harming the chickens themselves, and were once endemic - i.e. permanently at a high level in the population. However, within Europe commercial chicken flocks are usually now vaccinated against *Salmonella*, so it's much less common in raw chicken and eggs than previously. The bacteria are destroyed by cooking, so you should cook chicken meat and eggs thoroughly before eating.

Norovirus

Also known as 'winter vomiting bug', as it is more common in winter. This is a diverse group of viruses with many different strains. They usually cause either diarrhoea or vomiting or a combination of the two. Usually short-acting but can be severe, and particularly dangerous to the very old, very young, or immuno-compromised.

It is very easily spread through contact with infected people or touching things they've touched. Hence it is included as a food borne illness, as food prepared by an infected person is a common route of infection. The virus is shed in both stools and vomit, and one vomiting event may contain enough units to infect 100,000 people. The virus can survive on surfaces for weeks. Wash hands very frequently if you are infected, and wash bedding at 90°C. Infected people should not cook food for others.

Listeria

Listeria is a genus of bacteria, named after Joseph Lister - the antiseptic pioneer. *Listeria* may grow at temperatures as low as 0°C, and so it has become more of a problem as chilled 'ready to eat' food becomes common. Several species can cause listeriosis, a severe foodborne illness. Listeriosis is relatively rare - there are 160-170 cases a year in the UK. But ⅓ of those affected die. It can also cause stillbirth, miscarriage or premature delivery in pregnant women, which is why the NHS recommends pregnant women avoid soft cheeses, pâté, and unpasteurised milk.

Bacillus cereus

B. cereus is a spore-forming bacterium found in soil and food. It most commonly causes issues on rice dishes which have been kept at room temperature. The cells of *B. cereus* are destroyed by cooking at 100°C, but some spores can survive. If then kept at room temperature, these spores can germinate and grow producing a number of toxins. These are what cause the illness, so even subsequent cooking doesn't help.

Germination and growth generally occur between 10°C and 50°C, so cooked food should be eaten straight away - or be refrigerated, or kept warm at over 50°C.

Handwashing

Key to reducing the spread of foodborne illnesses is washing hands, effectively, at key times. Experts say those times are:-

- After using the toilet
- Before preparing food
- After preparing raw food
- After touching something you know to be dirty
- After arriving at school or work
- Before eating
- After coming home from being out/at school/at work

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

With special thanks to Dr Lesley Larkin, Dr Richard Elson and Jacquelyn McCormick of the National Infection Service, Public Health England, Dr Laura Evans, Food Standards Scotland, and Dr Lisa Ackerley, food safety advisor and consultant.

The kit has been produced by the I'm a Scientist team and commissioned by the SafeConsume project funded by the EU H2020 programme.

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SAFE CONSUME

e-Bug

Kit No. 13

Science Debate Kit: Food Hygiene

"Keep these kits coming please!"

For in-depth online resources on this debate go to: foodhygiene.imascientist.org.uk

Debate Kit: Food hygiene

Is it safer to eat at home or out at a restaurant?

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

Eat at Home	Eat out
• **Lauren Quinn - Mother of ill child**	• **Masuda Chowdhury - Environmental Health Officer**
• **Gus Farthing-Wood - Cookbook writer**	• **Henri Fournier - Chef**
• Hilda Guard - Chicken keeper	• Dan Murray - Festival food seller
• Nick 'nameless' Slevish - DJ	• Petya Todorova - Health visitor

Facilitation tips

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

Designed for KS4 but can be used with ages 11-18.

For groups who may need extra support you can put the following prompt sentences upon the board:
"I think it's safer to eat at home/in a restaurant because..."
"I think …… is the most important point to think about."

Learning notes

Learning objectives:

- To practise discussing and debating issues an expressing an opinion

Other learning outcomes:

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

Curriculum points covered:

Thinking scientifically

- Making inferences and drawing conclusions
- Evaluating risks
- Making decisions based on the evaluation of evidence and arguments

Substantive

- Learning more about communicable diseases and reducing and preventing the spread of infectious diseases in humans.
- Learning more about viruses and bacteria as human pathogens.

"Particularly like the format plus the accuracy of the scientific information"