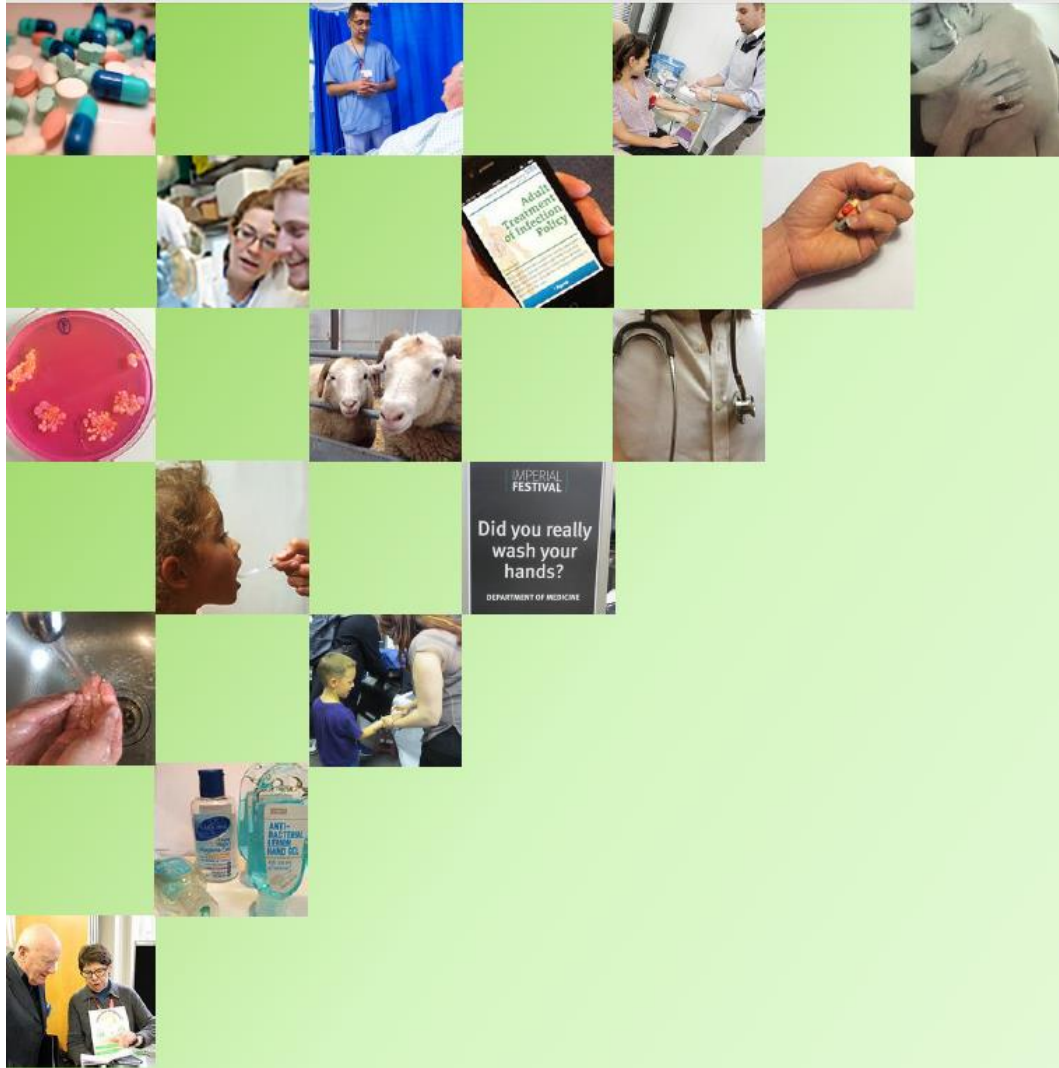


**Health Protection Research Unit in Healthcare
Associated Infection & Antimicrobial Resistance**



Lesson plans and learning resources

The spread of infection: Hand Hygiene for reception and year 1 classes

Time needed: 1 x 60 minutes

The Spread of Infection: Hand Hygiene

This lesson aims to help pupils understand that effective hand washing is important to minimise the risk of infection from potentially harmful bacteria. Pupils will also carry out a simple experiment to observe how bacteria can spread from person to person simply by shaking each other's hands, and learn about the correct way to wash their hands and when to wash their hands.

Members of the Imperial College Health Protection Research Unit in Healthcare Associated Infections and Antimicrobial Resistance can help deliver these lessons at West London locations as part of our Patient and Public Engagement Activities. To request our involvement please contact head.ops@imperial.ac.uk

National Curriculum Links

Communication and Language

- Children follow instructions involving several ideas or actions.
- They answer 'how' and 'why' questions about their experiences and in response to stories or events

Physical development, Health and self-care

- Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.
- They manage their own basic hygiene and personal needs successfully

Understanding the World

- They make observations of animals and plants and explain why some things occur, and talk about changes.

Lesson 1 Objectives

The objective of the lesson is to teach students a bit about microbes and when and why we need to wash our hands.

By the end of the lesson:

- All pupils will be able to describe **why** hand washing is important.
- All pupils will be able to describe **when** hands should be washed.
- Most pupils will be able to explain **how** to wash hands properly

Lesson variations

This lesson can be delivered as a simple hand hygiene lesson / experiment using either glo gel and AV lights which you can purchase yourself, or using oil and either glitter or cinnamon. Printable resources are also appended at the end of this document.

Alternatively the lesson can be supported by the Health Protection Research Unit in Healthcare Associated Infection and Antimicrobial Resistance. Representatives from the unit can bring glo gel, AV lights and printed resources. Contact head.ops@imperial.ac.uk

Suggested slides are included but can be modified as appropriate, or the session can be delivered without them.

Background teacher Information

Our hands are covered in microbes that spread rapidly from person to person via touch.

Microbes are tiny organisms; too tiny to see without a microscope. They live everywhere, in air, soil, rock and water, on plants and animals, even on our skin. Microbes are essential for healthy life; we could not exist without them. There are four main types of microbe; bacteria, viruses, fungi and protozoa. Some microbes, especially bacteria and viruses, are harmful to health. Common names for these harmful microbes that the children are likely to have heard of are germs or bugs.

Our skin, including our hands, provides a natural breeding ground for bacteria to grow. Our skin is typically covered in vast numbers of bacteria. It is estimated the total number of bacteria on the average human at any one time is around 1 trillion. Most of these bacteria have a useful role in protecting us from other bacteria that could potentially cause us harm through illness.

Sometimes bacteria that can cause us harm will grow on our skin. These bacteria may cause different types of infection that could make us very ill. For example food poisoning can be caused by a bacteria called Salmonella and is spread by touching or eating contaminated foods.

Washing your hands is one of the best ways to protect yourself from a bacterial infection that could cause you harm. It can also help to stop these bacteria from spreading to other people. Washing our hands regularly helps to remove the potentially harmful bacteria we collect from our surroundings during our normal day-to-day routine, for example in the home, at school, in the garden, playing with animals, or preparing food.

Rinsing hands in cold water may remove all visible signs of dirt and grime. However, washing hands in soap and warm water is a much more effective method to remove potentially harmful bacteria from our hands.

In addition to helping prevent bacterial illness, reducing the spread of bacteria in general through good hand hygiene also helps reduce the transmission of antibiotic resistance. Antibiotic resistance occurs when a strain of bacteria no longer responds to treatment with one or more types of antibiotics. For example, multi-drug resistant tuberculosis (TB) is resistant to two of the main antibiotics, isoniazid (INH) and rifampin (RIF), commonly used to treat TB. Bacteria are able to share the DNA which makes them resistant, with other bacteria. This means both that resistance can quickly spread and also that bacteria can become resistant to more than one kind of antibiotic (multidrug resistant organisms). Antibiotic resistant bacteria currently kill around 700,000 people every year and this figure is predicted to rise to 10 million by 2050.

Antibiotics have been the cornerstone of much of modern medicine, allowing routine surgery to be conducted without the risk of infection and the development of new treatments such as chemotherapy and transplantation which in weakening the immune system rely on antibiotics to stop the patients succumbing to illness. Antimicrobial resistance poses a catastrophic threat, which if it isn't addressed, could lead to a scenario where any one of us could go into hospital in 20 years for minor surgery and die because of an ordinary infection that can't be treated by antibiotics. Routine operations like hip replacements, organ transplants or caesarean section could be deadly because of the risk of infection

Research studies have shown that while people think that they already practice good hand hygiene, in reality this is often not the case and hand hygiene is not observed, or done poorly. Some experiments have found that approximately a third of men and two thirds of women washed their hands after using the toilet, although 99% said that they had! Other studies have shown that people do not wash their hands thoroughly enough, or for long enough.

Hands should be washed:

- Before, during and after preparing food
- After using the lavatory
- After exposure to animals or animal waste
- After coughing, sneezing or blowing your nose
- Before eating
- Before and after visiting ill people, for example in hospital

Hands should be washed for between 15-30 seconds, which is as long as it takes to sing “happy birthday” through twice.

There is a proper technique to washing hands which should be observed—see later.

Lesson 1 Plan

Timing	Activity	Resources
Introduction		
2 minutes	Lesson aims and objectives to be clearly explained to children and displayed	Slides provided
2 minutes	Using the slides provided explain what microbes are. They are sometimes called germs or bugs. There are three classes of microbes, bacteria, viruses and fungi. The first two are so tiny that they can only be seen under a microscope.	Slides provided
5 minutes	<p>Explain to the children that microbes can be helpful or unhelpful.</p> <p>The children will have experienced both kinds –</p> <ul style="list-style-type: none"> • Helpful microbes are used to make bread (yeast), and yogurt (live yogurt cultures) and even medicine (penicillin). Our body is also full of friendly bacteria which keep your tummy well (this is what probiotics drinks are supposed to “top up”) and friendly bacteria on your skin keep out unhelpful bacteria. • Unhelpful microbes can make you ill if they get inside your body. Viruses are nearly all unhelpful! 	Slides provided
5 minutes	<p>Before microbes can make you ill, they have to get into your body.</p> <p>Ask the children what different routes they think microbes might take to get into the body.</p> <p>After their suggestions, explain that <u>the most likely way that microbes get into the body is through people not washing their hands properly.</u> which means that microbes picked up during day to day activities, like playing in the garden, going to school, touching things at home, get transferred to the mouth.</p> <p>Explain that they will do an experiment to show how easily microbes can be transferred from one person to another and the importance of washing hands <u>properly.</u></p>	Slides provided
Timing		
Activity		
Resources		
25 minutes	Hand washing experiment	Three desks

	<p>Divide the students into three groups. Ask each group to line up in front of one of the desks:</p> <ul style="list-style-type: none"> - Unwashed hands - Hands washed in water - Hands washed in warm water and soap <p>Put a blob of glo-gel on the hands of the first student in each line. Tell them to rub it all over their hands.</p> <p>Explain to the class that they are pretending that the glo-gel is microbes that we all have on our hands. Like microbes it cannot be seen by the naked eye.</p> <p>Once the gel has been rubbed in, tell the child at the front of the “unwashed hands line” to firmly shake the hand of the child behind them. The second child in the line should then firmly shake hands with the child behind them and so on, all the way down the line.</p> <p>The child in front of the “hands washed in water” desk, should wash their hands in the basin provided, dry them and then firmly shake the hand of the child behind them and so on, all the way down the line.</p> <p>The child in front of the “hands washed in warm water and soap” should repeat this process having first washed their hands with the resources provided.</p> <p>Once this process has been completed, the AV lights can be used to check the children’s hands for traces of glo-gel.</p> <p>Check both sides of their hands and focus on the creases between fingers and between the hand and the thumb as this is where gel is most likely to remain after hand washing. The aim is to show how far down the line the gel (and so the microbes) have spread.</p>	<p>Two basins of water, one cold, one warm.</p> <p>Soap</p> <p>Paper Towels</p> <p>Glitter and oil or glo-gel and UV lights</p>
5 minutes	<p>In each of their lines, ask the children who DID NOT have glo-gel on their hands to sit down.</p> <p>Ask the children which line is the longest- the unwashed hands lines, the washed with water line or the washed with soap and water line.</p> <p>The experiment should show that unwashed hands transmit glo-gel/glitter (microbes) the furthest and that even washing with soap and water, <u>if not done properly,</u> can leave microbes on our hands.</p>	

10 minutes	<p>Now give the children (particularly those who did not have any glo-gel/glitter transferred to them) the opportunity to try and wash their hands properly in warm water with soap.</p> <p>You can provide additional glo-gel and then check for traces with the UV light.</p> <p>You are likely to find that they still have not managed to remove it all- even with warm water and soap!</p>	
Plenary		
10 minutes	<p>Explain to the children that they didn't not manage to remove all the microbes, because they haven't washed their hands using the proper technique or for long enough.</p> <p>Show children the recommendations for hand washing.</p> <p>You can do this using the slides, the hand-washing print out at the end of this document, or just by demonstrating.</p> <p>Get them to practice the correct method of hand washing, showing them the different stages/actions.</p> <p>The guidelines are to wash for between 15-30 seconds.</p> <p>Which is as long as it takes to sing "happy birthday through twice".</p> <p>You can practice handwashing correctly playing the hand-wash song on the slides, or by singing happy birthday through twice.</p> <p>The hand-wash lyrics are as follows:</p> <p style="padding-left: 40px;">Wash hands well each day, to keep germs away. Scrub with soap and water and be on your way</p>	Slides provided
	<p>Give children a printed copy of the hand washing guidelines each and a copy of the factsheet on Antimicrobial Resistance for Parents, both appended, to take home with them. If Imperial College is supporting the lesson, they will bring copies with them.</p>	

Preparing for the lesson: Materials and Instructions

At least a week in advance

- Contact head.ops@imperial.ac.uk. If you would like Imperial College to support the lesson.

On the day of lesson delivery you will need:

- Glo Gel and a UV light (or oil and glitter)
- 3 desks
- 2 basins for hand washing
- Soap
- Paper towels
- Access to warm water
- Computer access if using the slides

Hand hygiene kits (gel and UV light) can also be purchased online from a number of suppliers for around £35, or can be purchased separately. Gel costs approximately £6 for 50ml (good for 25 applications) and UV torches cost between £2 and £5 depending on the supplier.

Potential suppliers include:

- foodsafetydirect.co.uk,
- glowtech.co.uk
- handinspection.co.uk
- hygienicsolutions.uk
- uvgear.co.uk

ON THE DAY OF THE LESSON arrange three desks side by side.

Desk 1 – A sign saying unwashed hands

Desk 2 – A basin of water and a sign saying ‘Hands washed with Water’

Desk 3 – A basin of warm water, some soap and a sign saying ‘Hands washed with Warm Water and Soap’

Have your glo gel and AV light ready, or oil and glitter. If the Imperial team are supporting the lesson they will bring glo gel and AV lights with them.

Hand-washing technique with soap and water



1 Wet hands with water



2 Apply enough soap to cover all hand surfaces



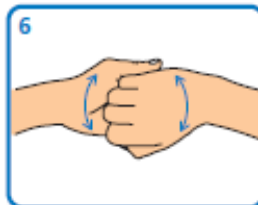
3 Rub hands palm to palm



4 Rub back of each hand with palm of other hand with fingers interlaced



5 Rub palm to palm with fingers interlaced



6 Rub with back of fingers to opposing palms with fingers interlocked



7 Rub each thumb clasped in opposite hand using a rotational movement



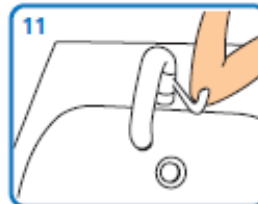
8 Rub tips of fingers in opposite palm in a circular motion



9 Rub each wrist with opposite hand



10 Rinse hands with water



11 Use elbow to turn off tap



12 Dry thoroughly with a single-use towel



13 Hand washing should take 15-30 seconds

Antimicrobial Resistance

What can I do as a parent?

“Antimicrobial resistance poses a catastrophic threat. If we don’t act now, any one of us could go into hospital in 20 years for minor surgery and die because of an ordinary infection that can’t be treated by antibiotics.”

Professor Dame Sally Davies, England’s Chief Medical Officer

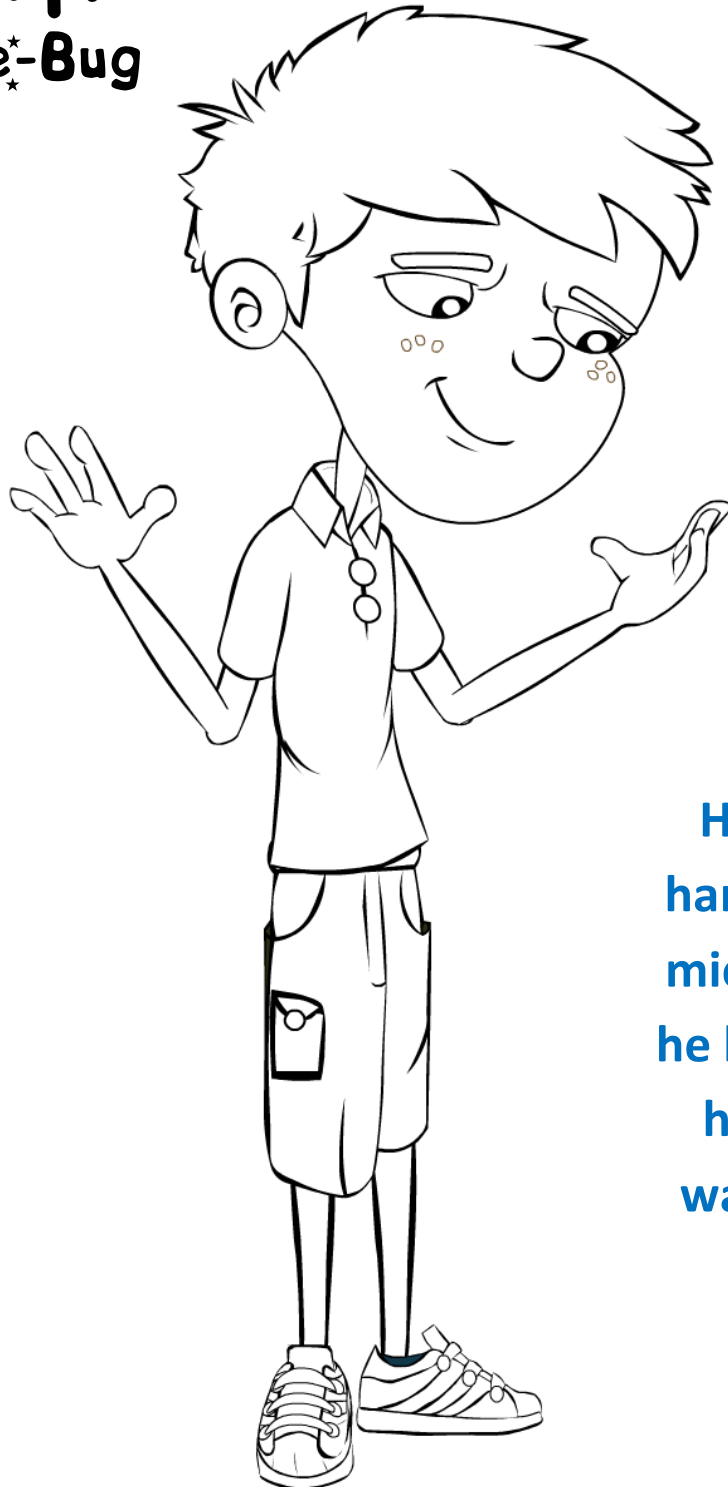
What can I do?

As more bacteria become resistant to treatment, we are in danger of running out of effective antibiotics. That means that childhood diseases we thought were almost eradicated, such as scarlet fever and bacterial meningitis, will soon be untreatable. Without antibiotics, now routine operations such as caesarean sections will become too high risk due to infection. **We need to act now!**

- Overprescribing is a major cause of resistance to antibiotics. Children are prescribed more antibiotics than any other group, because doctors find it hard to say no to insistent parents. Studies have shown that around 50% of those prescriptions are unnecessary.
 - Don’t* ask for antibiotics for your child when they are not needed.
 - Do* listen to advice from your doctor on controlling the symptoms of viral infections.
- Taking the wrong dose or missing a dose of antibiotics also contributes to increased resistance.
 - Don’t* stockpile old antibiotics for future use, or buy antibiotics from the internet.
 - Do* make sure your child finishes the whole course of medication, even if they feel better.
- Poor hand hygiene increases the chance of infection, and helps spread resistant bugs.
 - Don’t* prepare or eat food without washing your hands.
 - Do* make sure your family wash their hands properly (for at least 15 seconds) after using the toilet, coughing or sneezing, or touching animals or raw meat.
- Lack of knowledge about antimicrobial resistance means that not enough is being done to tackle it.
 - Don’t* ignore the issue
 - Do* talk to people about the problem, educate your children, involve your child’s school.

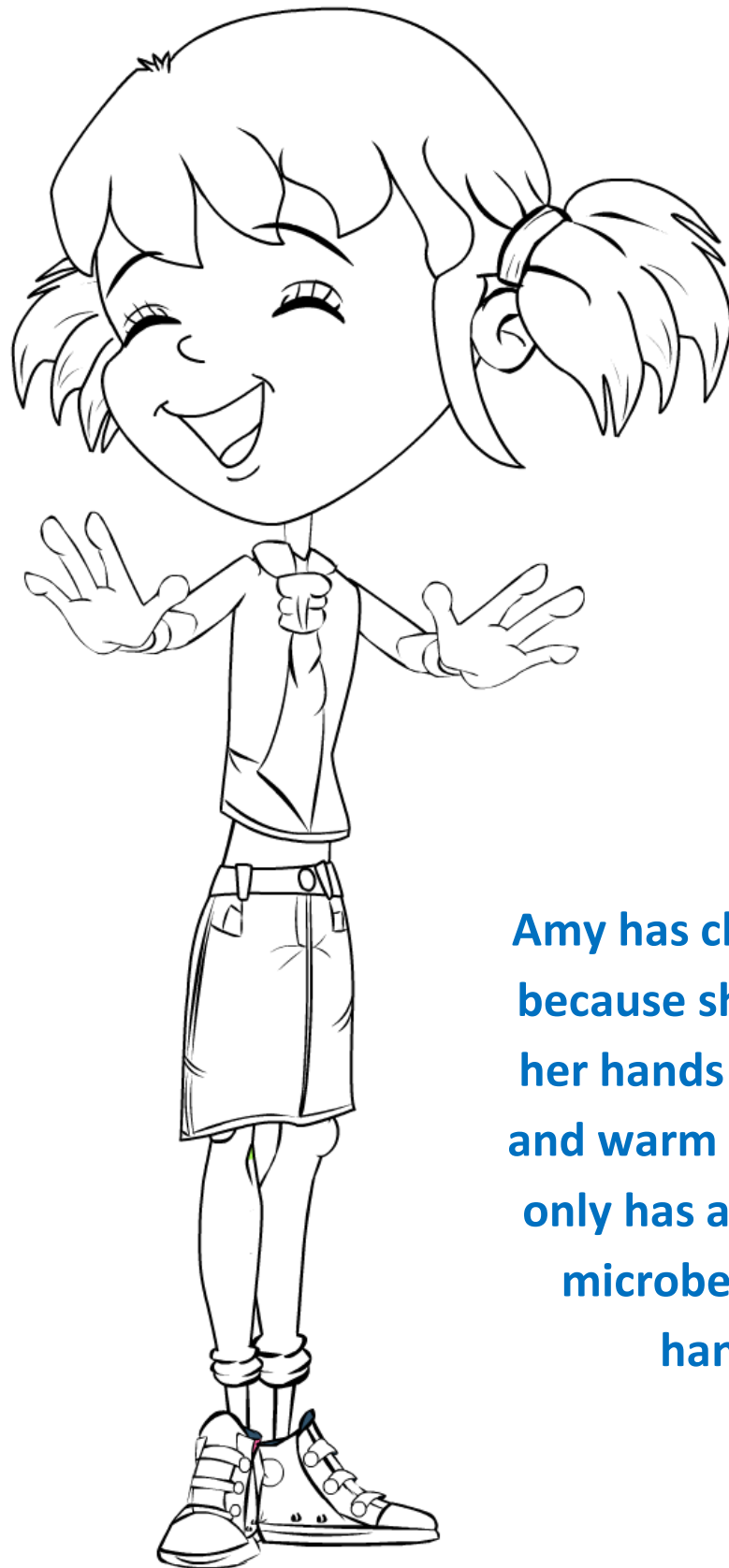
Go to www.imperial.ac.uk/hpruantimicrobialresistance for more information

Colour in Harry and make his hands look dirty!



Harry has dirty hands with lots of microbes because he has not washed his hands with warm water and soap

Colour in Amy to show she has clean hands!



Amy has clean hands because she washed her hands with soap and warm water. She only has a few good microbes on her hands.



Horrid Hands

Quiz- True or False? Take this quiz home and test you friends and family on their knowledge

2. We should only wash our hands once a day
3. We should never use soap to wash our hands
4. Microbes are all bad
5. Soap can remove more microbes than washing with water alone
6. For washing our hands, cold water is better than hot water
7. We should wash our hands after sneezing into them
8. Washing our hands often can help stop us getting ill
9. It takes 5 seconds to wash hands properly
10. We should wash hands before visiting hospital and before eating

Answers

1. **TRUE:** Microbes are found on our hands and when we touch things, we can spread these microbes on to other people.
2. **FALSE:** We pick up microbes from the things that we touch, so we should wash our hands often
3. **FALSE:** Soap helps to remove bad microbes from our hands so we should always use soap to wash our hands.
4. **FALSE:** Microbes can be both good and bad. There are good microbes in your tummy to keep you well and microbes can be helpful being used to make food such as bread and yogurt and even medicine (Penicillin)
5. **TRUE:** Soap removes the oil on our hands, which washes away microbes. This removes more microbes than washing with water alone.
6. **FALSE:** Hot water removes more microbes than cold water and so we should always wash our hands with hot water and soap.
7. **TRUE:** Sneezes contain bad microbes which can spread onto our hands when we sneeze.
8. **TRUE:** Washing our hands is the best way to remove bad microbes from our hands that could make us ill.
9. **FALSE:** it takes between 15-30 seconds to wash hands properly, which is as long as it takes to sing "happy birthday through twice".
10. **TRUE:** We should wash our hands before visiting people in hospital so that we don't take bad microbes into the hospital that could make people ill. We should always wash hands before eating to make sure we don't make ourselves ill by accidentally transferring bad microbes into our mouths on our hands.