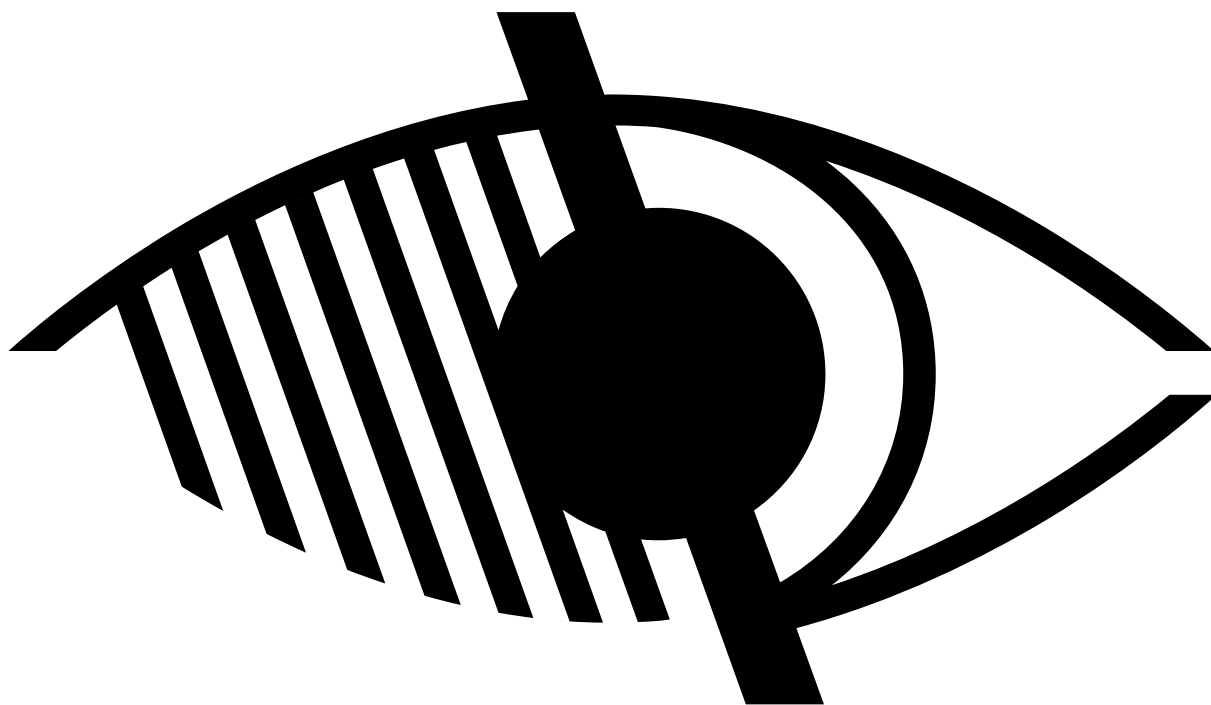


Large-print book





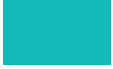


Please do not remove from the gallery



Operation Ouch! Food, Poo and You

Please leave in the holder near to the exit

Contents

Exhibition layout	3
Accessible features	3
Icon key	4
Introduction	5
 Mouth	6
 Oesophagus	20
 Stomach	26
 Small intestine	35
 Appendix	45
 Large intestine	47
 The Lab	59

Exhibition layout

Operation Ouch! Food, Poo and You! is in the Special Exhibitions Gallery, located in the basement of the main museum building, the New Warehouse.

The gallery is in a U-shape. The entrance to the gallery is on the left-hand side of the front desk and the exit is on the right-hand side.

Accessible features

All labels and text panels are included in this large-print book.

All videos contain closed captions and BSL interpretation.

There is step-free access to the exhibition via a lift at the back of the museum, through the Textiles Gallery.

Icon key



Labels linked to objects



Labels linked to personal stories



Labels linked to diagrams or images



Labels linked to interactives

Operation Ouch! Food, Poo and You

Let's go, Ouchers!

Are you ready for your special mission?

Help us find out what happens to food in your amazing body.

Dive into the digestive system with us as we go on our most outrageous *Operation Ouch!* adventure ever.

Hold on to your hats...
and your noses.

Mouth

The **mouth** is the start of your digestion journey.

Food is tasted and mashed up.

It takes about five seconds to chew and swallow...

Just long enough to pull on your socks.

Dr Chris: Wow! Something stinks...

Dr Ronx: That would be the onions Xand ate for lunch.

Dr Xand: There's still some stuck in my teeth if you're hungry?



Why do you have teeth?

Your teeth cut, rip and grind food.
Chewed food is easier to swallow.

Incisors cut into food.

Sharp **canines** rip and grip.

Premolars pass food
from the canines to the molars
when you chew.

Flat **molars** grind.



Dr Xand has some food stuck in his
teeth.

Can you guess what he ate for lunch?
Stick your hand in the hole.



Different diets

Animals have different types of teeth that suit the food they eat.

Carnivores, like cats, only eat meat. Their sharp teeth are shaped to tear and slice.

Herbivores, like deer, only eat plants. Their flat teeth are good at grinding and squashing.

Humans – like you! – are **omnivores**. Your pointy incisors and flat molars help you eat both meat and plants.

Dr Ronx fact: Brushing twice a day with toothpaste gets rid of germs and keeps your teeth healthy.

Dr Ronx fact: Enamel covers your teeth. Tooth enamel is the hardest substance in the body.



Hi my name is... Harry

Favourite food: Beefburger with chips

Super skill: Fantastic football goalie

I have a tooth condition. It really hurts when I eat ice cream or brush my back teeth.

My mum is teeth obsessed – she noticed that some at the back looked a bit brown and crumbly.

My other teeth are healthy.

The dentist said that I couldn't have stopped it from happening.



Hi my name is... Dr Carly

Job: Specialist in Children's Dentistry

Where I work: Royal Manchester Children's Hospital

Special skill: I'm ambidextrous. I can do fillings with both hands.

Meet the... dentist

Harry's got **Molar Incisor Hypomineralisation**.

It's when the first adult molars don't develop properly, making them weak and crumbly.

Eventually Harry's poorly back teeth could break and cause pain.

I'll help him look after them until they need to be wiggled out.

Dentists know how to help if children get teeth problems.



Molar incisor hypomineralisation (try saying this fast five times) can make molars crumble and turn brown.

White spots can also appear on incisors. Front teeth don't usually need to be removed.

Image: University of Manchester



X-ray vision

At 6 years old your adult teeth usually start growing to replace your baby teeth.
Do you remember losing your first tooth?

Did you know...?

Teeth grow from tooth buds, small cells inside your gums. You are born with buds for all your baby and adult teeth.

Push the button to see the X-ray.
Can you see the adult teeth hiding inside the jaw of this 6 year old?

Dr Chris: This is an ortho-*panto*-mogram...

Dr Xand: Oh no it isn't!

Dr Chris: Not that kind of panto! It's a type of dental X-ray.



False teeth

Dr Xand: I found these **false teeth** in the Cupboard of Everything. They were used about 100 years ago to replace someone's missing incisors.

Dr Chris: Before toothpaste and trips to the dentist, it was hard for people to care for their teeth.

Dr Ronx: These false teeth are quite small... Maybe they belonged to a teenager?

Science Museum Group
Object no. 1991-1455

How do you taste food?

Taste buds on your tongue send messages to your brain about the food you eat.

Dr Ronx Fact: Your taste buds are replaced every two weeks.



Bumpy tongues

Your tongue is covered with little red bumps called papillae.

Each bump holds around 100 tiny taste buds. The taste buds send signals about the flavour of your food to your brain.

Touch the bumpy tongue. What does your tongue feel like?

Dr Ronx Fact: Children have twice as many taste buds as adults. This makes them more sensitive to strong flavours, like bitter Brussels sprouts. Eeuw!



Taste detectors

There are five kinds of taste that all your taste buds can detect.

They are sweet, salty, sour, bitter and umami, a savoury taste found in foods like soy sauce.



Can you guess...

Which animal has the most taste buds?
Lift the flaps to find the answer.

Lions have very few:
470 taste buds,
just enough to make sure meat
hasn't gone bad.

Pigs have lots more than people:
15,000 taste buds,
which is why they like sweet fruit so much.
Oink!

Cats only have 473.
They don't have taste buds for sweetness,
so your mog won't be licking your ice cream!

Cows are the winners!
A moo-ssive 25,000 taste buds
to test which plants are poisonous.



Is your tongue longer than a...?

Stick out your tongue and see how you measure up.

Cat

6.3 cm

Chameleon

19 cm

Giraffe

54 cm

Dr Ronx Fact: Your tongue moves without the help of your bones, a bit like an elephant's trunk.



Food movers

Your strong and flexible tongue can move food in all directions around your mouth and between your teeth.

The tongue mashes food and pushes it towards your throat when it's time to swallow.

Did you know...?

Your tongue has eight pairs of muscles.

Pull the ropes to move the food.

Work as a team to balance the weight on each column.

What does your saliva do?

Saliva kills bacteria,
breaks down food and protects your teeth.

It mixes with your food so it's easy to
swallow.

Saliva is the medical word for spit.



Super slobber

Saliva is made by glands in your cheeks
and under your tongue.

Chemicals in saliva break down nutrients into
sugars, which can be used as energy in your
body.



Epic epiglottis

Dr Xand's fave body part.

The epiglottis is a life-saving flap at the back of your throat.

It snaps shut when you swallow to stop food going into your lungs where it can cause damage.

Did you know...?

Your epiglottis is shaped like a leaf.

Chomp!

Your mouth breaks food into smaller pieces.

Your tongue and teeth mash and shape your food into a **bolus**...

A small ball of easy-to-swallow chewed-up food mixed with saliva.

Oesophagus

The slippery **oesophagus** is a tube that carries food from your mouth to your stomach.

Dr Chris: Incr-edible! We're in your **oesophagus**, Xand.

Dr Xand: Oesophagus. That's quite the mouthful.

It takes ten seconds for your food to travel to the stomach... Just long enough to tie your shoelace.

How does food get to your stomach?

Muscles relax and contract, squeezing food down your oesophagus and into your stomach.

Dr Ronx Fact: Oesophagus comes from the ancient Greek word for 'to carry food'.



Tongue-to-tummy transport

Your wet, mushy food is *squeeeezed* by muscles.

The muscles move in waves,
pushing the ball of food
down the throat to your stomach.

This is called **peristalsis**.

Did you know...?

Slippery mucus covers the walls of the oesophagus. This helps your food to move smoothly.

Squeeze the ball along.



Don't try this at home!

You can swallow upside down.

That's how astronauts can eat when floating in spaaaaaaace.

Smooth muscles in the oesophagus push food into the stomach.



A penny for your thoughts

Dr Chris: This **penny** was swallowed by a three-year-old boy nearly 100 years ago!

Dr Xand: Doctors had to operate to take it out of his stomach. No more pocket money for him...

We find the strangest stuff in the Cupboard of Everything.

Science Museum Group
Object no. A78555/1



Whoops!

It's dangerous to swallow anything that isn't food or drink.
Coins, keys and hair clips...

Doctors have found all sorts of weird objects in children who had swallowed them by accident.

Dr Ronx Fact: An adult's oesophagus is around 25cm long – about the length of a ruler.



Food-free zone!

Choking happens when food goes into your trachea, which is your windpipe.

If you see somebody choking, go and find an adult.

Hit the person between the shoulder blades with the heel of your hand up to five times.



Beeeeeeep!

Doctors sometimes use metal detectors to find coins children have swallowed.

It can be dangerous if something is stuck in a patient's throat or lungs.

Did you know...?

X-rays are also used to see inside a patient's body.

Scan the bodies. Use the metal detector to find the swallowed coins. When you hear a 'beep' you've found one!

What does a sphincter do?

Tight rings of muscle called sphincters let food in and out of your oesophagus.

Dr Ronx Fact: You swallow over 600 times a day. Gulp!



Special delivery!

Sphincters are like doors.

In the oesophagus a sphincter opens when you swallow to let food into the stomach. When it is closed it stops food and acid from coming back up.

Did you know...?

When you burp your sphincter can open and a little bit of stomach acid sometimes shoots up into your oesophagus.

Buurrrpp!

Put a bean bag in the tube. Open the sphincter doors to drop food into the stomach.

Stomach

The **stomach** is a stretchy sac filled with acid that kills germs and breaks your food into bits.

It takes about three hours for food to be broken down in the stomach. A big meal can take up to eight hours... That's all day at school!

Plop! Balls of food drop into your stomach. Your food turns into **chyme**...

A mushy mix of stomach acid, enzymes and small pieces of partly digested food.

Why do you have acid in your stomach?

Stomach acid kills bad bacteria and helps break food into small pieces.

Dr Ronx Fact: You burp up to 30 times a day. Better out than in!



Scrub your grub

The stomach cleans your food by washing it with a strong acid, killing bacteria.

Chunks of food mix with the acid as they churn in the stomach.

Did you know...?

A layer of wet, slippery mucus protects your stomach from the burning acid.

Rock to mix the food and acid. Slosh the stomach left and right to churn the food.



Enzyme time

Bacteria busting stomach acid also kick-starts incredible chemicals called enzymes.

Some enzymes in your stomach break down nutrients like proteins into teeny tiny pieces that can be absorbed into the blood.

Your body uses protein to build muscle and make your skin and hair.



Stomach storage

The stomach is like a bag that can store food for hours.

This gives enzymes time to break down your meal.

It is the only part of the digestive system not shaped like a tube.



Whack-a-bacteria

Your stomach is full of good and bad bacteria.

Strong acid in your stomach kills most of the harmful bacteria you might have eaten.

Did you know...?

Your body stores some bad bacteria so that your immune system can learn to fight them.

Press start to play. Whack the red lights as fast as you can, but don't hit the blue ones. What's your highest score?

What do stomach muscles do?

After a big meal, your stomach muscles stretch to hold more food. Stomach muscles also help to grind food.



Squeezy stomach

Your stomach walls *squeeeeeeze* in and out to churn and grind your food.

This helps break food into smaller chunks and allows it to move down to the intestines.

Did you know?

Your stomach churns about three times a minute. Can you squeeze the stomach to break down the food?



Streeeetch!

The stomach wall is packed with wrinkly ridges called **rugae**.

The rugae stretch and expand when you eat so your stomach can hold more food.

Dr Xand: More room for second breakfast.
Yum!

Dr Chris: Don't be so greedy Xand!

Dr Ronx: Don't be so greedy Xand!!

Why do you throw up?

Your body pukes to get rid of viruses and bad bacteria hanging around in your stomach.



Larry the vomiting robot

Meet Larry.

He's a robot made to show how far your vomit can go.

Vomiting is another word for being sick. It's the way your stomach tells you something is wrong.

This is how some viruses, like sickness bugs, spread.

Lent by HSE Science and Research Centre
Loan no L.2023-001



Vile vomit

When your body detects bad food or viruses in your stomach, your stomach muscles automatically squeeze tight.

This shoots any food and acid up your throat and out of your mouth at around 40mph.

Did you know...?

Fear of being sick or seeing vomit is called emetophobia.

Press the button. Switch on the UV light to see Larry's sick splatter.

Can you guess how far vomit can travel?

When you are sick, germs can travel over 3 metres. Ugh!



Hi my name is... Dr Catherine

Job: Specialist Inspector

Where I work: Health and Safety Executive

Favourite virus: Herpes because it looks like a fried egg.

Meet the... inventor

I built vomiting Larry to find out how far sick and any bugs contained within it can travel.

The research with Larry tells us how many of those bugs can survive being vomited, how many are present in even the smallest of droplets and how long they can survive without being cleaned up.



Mystery object

I found this weird thing on a shelf in the Cupboard of Everything. Can you guess what it is?

- A. A bicycle seat
- B. A hot-water bottle
- C. An engine from a spaceship

ANSWER

B. It's a hot-water bottle. It was used in a hospital to help children with stomach ache over 150 years ago.

Science Museum Group
Object no. A190929



The gatekeeper

The pyloric sphincter acts like a gate between the stomach and small intestine.

Chunks of food have to be smaller than 2mm to pass through the sphincter. That's about the thickness of a 2p coin.

Small intestine

The super **small intestine** breaks down food and absorbs the nutrients you need to stay alive.

It takes two or three hours to absorb food into the bloodstream in the small intestine... Just long enough to watch your favourite film.

Dr Ronx: It's a tight squeeze in here...

Dr Xand: Well, it is my small intestine, after all.

Dr Chris: It might be narrow, but it's the longest part of your digestive system... It could take a while to get out.

Your food is still **chyme**...

A creamy mush of partly digested food and stomach acid. In the small intestine, chyme mixes with water and other digestive juices like bile.

What are villi?

Villi are like tiny hairs in the intestine that absorb nutrients into your blood.

Dr Ronx Fact: Each hair-like villus is covered in its own teeny microvilli. This means more nutrients can be absorbed.



Supersized villi

Millions of villi stick out of the wall of your small intestine.

As food in the chyme moves along and touches the villi, every nutrient is absorbed.

Dr Ronx Fact: Villi sway from side to side so they can absorb more nutrients. Imagine the millions of villi moving inside you right now.



Brilliant blood

Nutrients such as fats, sugars and proteins are used by your body for growing, running, jumping and playing.

They are absorbed by the villi and pass through the walls of your intestines into the blood.



If you stretched out your small intestine, it would be a whopping 6 metres long... as tall as a giraffe.

Despite it's name, the small intestine is the looongest bit of the digestive system.



Hold it together

Why don't your intestines get tangled up...?

The magnificent mesentery. It is a stretchy sheet of cells that attaches your guts to the inside of your body. The mesentery stops your intestines getting tied in knots.

Dr Ronx Fact: The mesentery carries blood between the intestines and the rest of the body.



Gut orchestra

Liquid and gas travelling through your digestive system makes noise. Burps and farts are your body's way of releasing trapped gas.

Did you know...?

Tummy rumbles usually come from your small intestine, not your stomach! The sound is called **borborygmi**.

Move your hand over a body part to make a noise.

What does bile do?

Bile is a greenish-yellow liquid made in the liver. It helps you digest your food by breaking down fats.

Dr Xand: Where are we?

Dr Ronx: We're taking a detour to the liver and the gallbladder to talk about bile.



Bile style

Bile is like your body's washing-up liquid. It breaks down the fats in your food making them easier to absorb in the small intestine.

This means your body can get vitamins and useful energy out of the fat you eat.

Dr Ronx Fact: Bile is stored in a small sac called the gallbladder. When you eat fatty foods, bile is squeezed into your small intestine.

Why do you need nutrients?

Your food is packed with nutrients which your body needs to stay healthy.



Life-savers

Nutrients give your body all it needs to run, jump, learn and grow. **Proteins** are used to build muscle and repair the body.

Carbohydrates give you energy and act like fuel for your body's cells. Some for longer than others. Your body turns them into glucose, a type of sugar that is absorbed into your blood.

Fats are your body's energy store and help you to grow. There are good and bad fats.

Vitamins do hundreds of different jobs. Not having enough can make you sick. Vitamin B1 helps your body break down and

release energy from food. Vitamin C helps protect your body's cells.

Minerals like calcium keep your bones and teeth healthy.

Fibre isn't a nutrient, as it can't be broken down by your body, it's still important that you eat fibre, as it helps move food and waste through your digestive system.



Bags of nutrients

Nutrients are absorbed by the villi in your small intestine and pass into your blood.

Eating a balanced diet with lots of different foods will give your body all the nutrients it needs.

Did you know...? Your nutrients need each other. Good fats, found in foods like olive oil and avocado, help you absorb important vitamins.



Gift to the Gods

Dr Chris: Ancient Romans made these **tiny intestines** to give to the gods, hoping they would cure digestive problems...

Now I know what to get Xand for his birthday!



Hi my name is... **Love**

Favourite food: Cheeseburger

Super skill: I can swim really far

I have Crohn's Disease. There were bits of blood in my poo and I was too tired to run around with my brothers and sisters.

I've been going to the hospital for medicine and now I've got my energy back.

I'm not going to let Crohn's stop me from having fun and achieving my dreams.



Hi my name is... Selina

Children's gastroenterology specialist nurse
Royal Manchester Children's Hospital
Special Skill: making kids laugh

Love has Crohn's disease, which means her intestines become sore and swollen. It causes tummy pains, poo with blood in and more trips to the toilet.

Crohn's can stop the small intestine from absorbing nutrients properly, making Love more tired. My job is to help children like Love keep the condition under control with medicines.



Pill-sized camera

This is a camera that is swallowed like a pill. It's called a **capsule endoscope**.

It takes photos and videos inside the digestive system.

This means doctors can see problems in hard-to-reach areas, like the small intestine.

The images are sent wirelessly to a recorder worn on a **belt**.

Dr Chris: This camera is a mini miracle.

Dr Xand: Eeuw! That just came out of someone's bum.

Appendix

The job of the **appendix** is a bit of a mystery...
It might be a store for good bacteria.

The **appendix** is about the same size as a grown-up's little finger.

Dr Xand: We don't really know what the appendix does.

Dr Chris: Some scientists think your appendix stores good bacteria, to help you recover after an infection.

Dr Ronx: Lots of people have their appendix removed. You can live safely without it.



Hi my name is... **Dr Paul**

Job: Consultant children's surgeon
Royal Manchester Children's Hospital
Special skill: Keeping cool under pressure

Appendicitis is an infection that causes the appendix to become inflamed. It happens when the appendix gets blocked by mucus or hard little bits of poo.

It causes vomiting, pains in your tummy and a temperature. Surgeons like me usually take the appendix out during an operation called an appendicectomy.



Spy inside

This is a **laparoscope**, a long thin camera doctors use to see inside a patient's body during an operation, like when they remove an infected appendix.

The laparoscope and special tools are pushed through tiny cuts made near the belly button.

Large intestine

The **large intestine** sucks water from the food you didn't absorb and turns the waste into poo.

It takes up to 50 hours for undigested waste to move through your large intestine...
More than a whole weekend!

All the nutrients are absorbed from chyme in the small intestine. Any leftovers move into the large intestine.

This watery mix of mush, fibre, bile and bacteria turns into **faeces**...
The scientific name for poo!

Dr Ronx: Hold your noses, Ouchers...

Dr Xand: Things are going to get stinky!

How is poo made?

Water is sucked out of the food you didn't absorb. Poo is the soft but solid stuff that is leftover.

Dr Xand's incredible poo-poo empoorium

Guess who did the poo.
Spin the blocks to choose an animal.
Lift the flaps to find the answers.

The shape and colour of your poo are linked to the food you eat and the nutrients you absorb. The same is true for animals.

Did you know...?

Slow moving sloths only poo once a week. They spend all their time up in the trees but will only poo on the ground.

ANSWERS [under flaps]

Wombat

It's square! Wombat intestines have stretchy walls that make cube-shaped poos. They mark territory by making tall towers of poo. Cubes of poo don't roll away and make it much easier to build.

Rabbit

So small. Rabbits have two types of poo. They eat the first kind! Cecal pellets are packed with nutrients. Rabbits eat these droppings to stay alive. Fecal pellets are regular poo, which they don't eat.

Blue whale

Pink! Blue whale poo is pinkish-red because they eat so much krill. Krill are tiny sea creatures, a bit like pink shelled shrimp. Whales poo up to 200 litres in one go, that's over a bath full!

African lion

Why is it white? Lions eat the bones of their prey. The bones are full of calcium, turning their poo bright white.



Perfect poo

A good poo is like a soft sausage. You don't want your poo to be too hard or runny.

Fibre found in foods like nuts, seeds and the skin of fruits, helps you make a healthy poo.



Poo factory

Muscles move leftover fibre, bile, bacteria and water through the large intestine. Water is sucked out of this mix, which clumps together to make poo.

Did you know...?

You make about 150g of faeces everyday... about the same weight as an apple.

Can you make the perfect poo? Spin the wheel to start the poo poo production line. Pump the handle to soak up water from the poo.



Smelly syrup

Dr Xand: Sniff sniff...

Is that the sweet smell of flowers? Mmm.

Dr Ronx: About 300 years ago this **jar** was full of a hot syrup made from roses.

Dr Chris: The writing on it means 'laxative syrup of roses', a medicine given by doctors to help people poo. Stinky!

Science Museum Group
Object no. 1985-2256/1



Hi my name is... Dr Fiona

Job: Looking after children who have tummy problems

Where I work: Alder Hey Children's Hospital

Special skill: Talking about poo (a lot!)

Meet the... Gastroenterologist

I'm part of a team that helps poorly children like Harry, live their best life. Harry's great – really funny and quite quirky.

He has PIPO – paediatric intestinal pseudo obstruction, which means the nerves and muscles in his intestines don't work well.

Harry has trouble pooing and we use medicines to help him with that.



Harry's bag

Harry is fed through a tube straight into his small intestine. He gets all his nutrition, as well as medicines, through a special liquid feed.

Stomach juices drain into a **bag** like this, which stops Harry feeling sick when there's a blockage. Every 6 months, Harry has an operation to replace the feeding tube.



Hi my name is...Harry

Favourite animal: My kitten Garfield

Special skill: My knowledge of dinosaurs

I have **pseudo obstruction**. The muscles in my intestine don't move poo along properly. I'm in hospital a lot to change my feeding tube – the doctors and nurses call me the ward cat.

I don't see myself as different. I'm a positive person. On the days when I don't feel great, I tell myself, just try again tomorrow.



Bacteria in your body

Over 400 species of bacteria live inside your large intestine.

Good bacteria are your gutsy little helpers. They eat waste and break down food your body can't digest on its own.

Bad bacteria can make you sick.

Your gut bacteria weigh up to 2kg... the same as two bags of sugar.



Heroes

Good gut bacteria live in your intestines as your happy house guests. Some are heroes against illness and help you digest nutrients.

1. Lovely *Lactobacillus* makes a slimy mucus shield, which protects the intestine.
2. Excellent *Escherichia coli* helps your cells absorb iron, which you need to grow.
3. *Enterococcus faecalis* can battle bugs that cause diarrhoea.



Villains

Bad bacteria are villains that can cause vomiting, diarrhoea and serious diseases.

4. Sneaky *Salmonella* slips into people's guts on raw or undercooked food.
5. Vile vaccine resistant *Enterococcus* fights back against the medicines we use to treat infections.
6. Awful anti-resistance *E. Escherichia coli* can spread when people don't wash their hands.

What is the microbiome?

Your microbiome is a bit like a tiny jungle. Only instead of animals, it's full of microscopic living things, mostly bacteria.

**Dr Ronx fact: There are more than 100 trillion bacteria in your microbiome...
Most live inside your large intestine.**



Poo transplant

You might have heard of organ transplants, but did you know doctors can also transplant poo?

Patients with weak microbiomes can take **pills** full of healthy poo and good bacteria, which start to grow in their intestines.

People with healthy poo send it to hospitals in special **containers**.

Lent by Guy's and St Thomas NHS Foundation Trust

Loan nos. E2023.0053.1, E2023.0054.1

Why do you fart?

You need to fart to let out all the gases that build up inside your intestines.

Dr Ronx fact: On average, you fart enough in one day to fill a party balloon.



Fantastic farts

Did you know...?

Farts are gases that build up in your gut. You trump about 14 times every day. We all do it... even your teacher!

Have you ever noticed that some farts smell like rotten eggs?

Some bacteria munch on sugars in your large intestine. This makes an eggy-smelling gas called hydrogen sulphide.

Doo-doo you dare take a sniff?

Will you find the chocolate and strawberries, or stinky feet and farts?



Poo o'clock

Your rectum holds your poo until it's time for the loo. Muscles contract and relax pushing poo towards your anus, the opening at the end of your large intestine.

This is where poo leaves your body. All the poo you've been making eventually reaches the anal sphincter, a tight ring of muscles.

A message is sent to your brain telling these muscles to relax, so you can poo!

Dr Xand: Oh. It's happening.
Get me to the loo. Get ready.
3, 2, 1...poo!!!!



Pop on your poo hat. Time for you to join the poo.

Dr Ronx fact: The large intestine is about 1.5 to 2 metres long... about as tall as a grown up.

The Lab

You're back in the real world.

Explore our super-secret lab!
It's home to unbelievable science
and incr-edible experiments...

And all of our stuff.



Organ-iser

You'll eat about 30 tonnes of food in your lifetime... the same weight as 20 hippos!

Your digestive system is a giant tube that runs from your mouth to your bum. Each part does an important job.

Can you put the organs back in the right order?

Can you help the Doctors find...

Stethoscope

Lab coat

Cheese

Dr Xand's underpants

Spaghetti

Dr Chris' Apron



Wonderful wee

The urinary system removes waste, like extra water, which leaves the body as urine or wee.

You need to hydrate, which means to drink lots of water, to keep your body happy and healthy.

The colour of your wee shows you how much water you need to drink.



Lab Drawers

Sorry we missed you!

Out on official Doctor business.
Can you look after the lab while we're away?
Have a good look around...
Just don't open the fridge!
Chris, Xand and Ronx

Dr Xand's super-secret snack drawer

Starter

Mr Grumble's soup of the day
Made with the freshest ingredients foraged
from the forest floor

Main

Spaghetti Bolognese
Home-made pasta in a Bolognese sauce

Dessert

Fruit salad
A selection of summer fruits

Operation Ouch! Lab rules

- Wear protective clothing
 - Safety goggles must be worn
 - Keep it clean
 - No eating or drinking
 - No sleeping
 - No baking
-

Rule breaking in the Lab

I've caught Dr Xand:

Eating – 16 times

Sleeping – 10 times

Doing his nails – 1 time

Picking his nose – 22 times

Setting things on fire – 2 times

Farting – 14 times

Ouch Lab jobs schedule

Rub-a-dub-dub scrub the tub

Mop the ceiling

Destink the sink

Straighten the string
Desticky the glue
Tidy the Cupboard of Everything

Gross!
Xand, you need to tidy your test tubes
and make sure the Cupboard of Everything
is squeaky clean.

Rinse it before it starts to reek.

Chris

Dear Dr Xand

Official shutdown notice

It has come to my attention that your highly
dangerous (and seriously smelly)
underpants experiment is still ongoing. In
my previous letters, I insisted that you stop
running this outrageous activity.

This experiment has broken Operation Ouch! lab safety rules on at least 452 occasions.

Please dispose of your pants in a safe, responsible and timely manner – and do not carry on in secret!

Consider this your final warning. This notice takes effect **immediately**.

Yours faithfully,

Dr Chris

**Operation Ouch Lab Health and Safety
Officer**

Dr Xand's Underpant Experiment

Tuesday, 9.42am

Dr Xand's Notes:

I've been running my pants experiment for 87 days in a row!

They haven't seen a washing machine in a *looong* time.

I think it might be some kind of world record.

Observations:

Things are getting super-stinky.
The cloud of gas gets greener
by the day (ooh, it matches my scrubs!).

Smells:

Rotten eggs
Odorous onions

Under the microscope:

Bursting with bacteria

Notes:

The Health and Safety Officer wants to shut
me down.

We'll see about that!

Dr Xand's spare poo samples

Guinea pig Observation: Teeny tiny

Sheep Observation: Very shiny

Tiddles the cat Observation: So curly

Mr Grumbles Observation: Ooh, fluffy

Dr Chris

Job: Infectious diseases doctor

Special skill: My extraordinarily powerful and curious mind

About me...

If I wasn't a doctor I'd like to work with animals and birds, looking after their habitats and the environment.

Dr Xand

Job: Expert in helping people affected by war and poverty

Special skill: My nerves of steel

About me...

I looove apples. I eat five a day.
I'm probably eating one right now.

Dr Ronx

Day job: A&E doctor

Special skill: My lightning reflexes

About me...

The brain is my favourite part of the body.
It's never full up and can always take in new information.



Duplo interactive

Stick on a nutrient block. Help build a balanced diet.

Eating lots of different foods gives your body all the nutrients it needs to grow, play and learn.



Hi my name is... Desiree

Job: Microbiologist

Where I work: Guy's and St Thomas' NHS Trust

Favourite food: Lasagne

Favourite bacteria: *Streptococcus*. They look like tiny pearl chains under a microscope.

I spend lots of time looking through a microscope at the tiny living creatures that live inside us, like bacteria.

Some bacteria are good and help you. Others can harm you. Part of my job is to test patient's poo. From the microorganisms (like bacteria) we find, we can tell which medicines can help fight infection.

Hungry for more?

Play our gut-busting game. Guide Doctors Chris, Xand and Ronx through each zone of the digestive system. Scan the QR code to play.



Head over to BBC iPlayer for more Operation Ouch!

From sneezes and snot to pimples and poo, nothing escapes the Doctors' crazy experiments. Scan the QR code to watch.



Acknowledgements

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