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In this activity you are going to create your own digestive system model.

SECTION 1: INTRODUCTION

Hi, I'm Harry and I'm a science communicator. I really love science and have always been fascinated with learning about how the world works and the cool discoveries being made every day.

I studied science at university, but realised I didn't want to be a scientist. Instead, I wanted to blend my scientific side with my artistic side and think of creative ways to talk about research.

One of my favourite parts of my job is working with lots of different scientists who are working on lots of different things, from virtual reality to artificial intelligence to medicine. I really enjoy thinking of fun ways to talk about science and I've even made a medicine-themed escape room!

One of the science projects I work on is called CoDiet. The scientists involved in **CoDiet** are looking into how what we eat can affect our health. They're testing a camera that uses artificial intelligence to recognise the food you're eating and how good it is for you – how cool is that!

Eventually, CoDiet hopes to come up with an easy way to give personalised advice on which foods to eat, to make us all healthier and happier.





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SECTION 2: THE DIGESTIVE SYSTEM

Food plays a big role in our overall health. Understanding the link between diet and disease is important, so that we can make the most informed choices about what we eat. However, we know that food affects everyone differently. This means it's also important to understand how our bodies process and digest food.

The **digestive system** is a complex network of organs that work together to break down food into useful things called nutrients that the body can absorb and use for **energy, growth** and **repair**.

It begins with **ingestion** when you put food into your mouth. Your teeth break down the food and mix it with saliva.

The chewed food travels down the food pipe (**oesophagus**) to your **stomach**. The stomach is like a mixing bowl where the food we eat is mixed with gastric juices containing **acids** and **enzymes**. The gastric juices break down the food even further into a thick liquid called **chyme**.

The chyme then moves along to the **small intestine**. Here many nutrients like protein, carbohydrates, and fats are absorbed into the bloodstream.

The leftover waste products then move into the **large intestine**. This is where water and electrolytes are absorbed before the digested food is stored as poo (**faeces**) in the **rectum**.

The **anus** is the flexible opening at the very end of the digestive system, in the bottom. It is normally closed but can open to allow faeces to leave the body.



MICROBIOME

The digestive system is home to tiny creatures called the **microbiome**. Made up of hundreds of different types of bacteria, viruses and fungi (microbes), your microbiome helps you break down your food, absorb nutrients, and fight disease.

Everyone has a different mix of microbes in their microbiome, which can help explain why some of us react differently to the same food.

2



SECTION 3: YOUR CHALLENGE



We want you to use what you've learned to create your own digestive system model and use it to explain how the system works!

Use the pictures on this page and the next to help you decide how to make each part. They don't have to look exactly like they do in our bodies. Try to make them a similar shape and then you can even label them. You could make some parts of the system 2D by cutting their shape out of card. You could even make some 3D parts by using materials like cotton wool or rolling card into tubes.

If you have dry recycling materials in your recycling bin such as egg cartons or cereal boxes you could use them as well. Make sure to ask your adult first though!

→ STEP 1 THE MOUTH AND OESOPHAGUS

Let's start by creating a mouth and teeth. Try feeling the shape of your teeth with your tongue or look in a mirror. Now find or make something that looks like a long tube to create the oesophagus. The oesophagus is also known as the food pipe, as food travels down it to the next part of the digestive system.

→ STEP 2 THE STOMACH

Food travels down the oesophagus to the stomach. Can you find or create something big and circular to make a stomach? Look at the picture to give you an idea of the shape.

3



Mouth

Oesophagus

Liver

Stomach

ancrea





→ STEP 3 Small intestine

The small intestine sits below the stomach and is long but coiled-up. What could you use to make this wiggly part of the digestive system? Look at the pictures for some ideas.

→ STEP 4 Large intestine

The large intestine is wider than the small intestine but wraps and curves around it. Create a tube-like shape wider than the small intestine for this part.

→ STEP 5 Microbiome

The microbiome is mainly found in the large intestine. Use some of your materials to make bacteria of different shapes and colours to sit inside the large intestine. You could give each one a different personality!

→ STEP 6 Rectum

The rectum is a small tube at the end of the large intestine. Find something to create this second to last part of the digestive system and attach it to the large intestine.

→ STEP 7 Anus

Lastly, the anus is the opening at the end of the digestive system where faeces leave the body. Add a label to the end of the rectum to represent the anus.

And there you have it; you've made your own digestive system model that's unique to you!

PRESENT

Try using your model to talk about the digestive system and how it works to an adult or a friend. Can you describe what each part does? Have you learnt anything new? You can create your own microbiome personalities









SECTION 4: EXTRA CHALLENGE

The digestive system is complicated and other organs in your body also have a role in digesting food. Here are some of the important ones:

Pancreas

The pancreas makes something called **insulin**, which helps your body use the sugar from food for energy. The pancreas also releases enzymes into the intestines, which break down carbohydrates, protein and fats in food.

🔶 Liver

The liver does lots of important jobs in the body! The liver makes **bile**, which helps the body break down **lipids** (fats and oils) and keeps your blood in good shape. Bile is stored in the **gallbladder** until it is needed.

Can you make a pancreas, liver and gallbladder to add to your model of the digestive system?



DIET AND DISEASE

We've talked a bit about how **CoDiet** is a science project that is looking at how our diet can impact our health, but what does that actually mean?

The scientists are trying to understand how what we eat might affect the risk of people developing certain diseases like diabetes, heart disease and obesity.

An unhealthy diet could include lots of sugar, saturated fats and salt. It could also be low in fruits and vegetables, which might increase the risk of developing some of these diseases. When we eat a balanced diet, we give our bodies the best chance at lowering the risk of developing these diseases.



In the UK, our healthy eating model is called the **Eatwell Guide**. The guide provides tips for how to follow a balanced diet, by encouraging people to:

- Eat at least five portions of different fruits and vegetables every day.
- Base meals on high-fibre and starchy foods like potatoes, bread, rice or pasta.
- Have some dairy or dairy alternatives (such as soya drinks).
- Eat some beans, pulses, fish, eggs, meat and other protein.
- Choose unsaturated oils and spreads and eat them in small amounts.
- Drink plenty of fluids or water (at least six to eight glasses a day).

DESIGN

On the next page there is a picture of the Eatwell Guide and a blank version for you to fill in. Try designing your own balanced plate. Use the guide to help you and choose your favourite foods from each group! If you choose foods not on the guide, decide which group they go into!



6

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