ABOUT THE TRAIL

WHAT WILL WE DISCOVER?

If you are interested in learning more about how the human body works the Body Bits Trail is for you. The trail explores topics including respiration, musculature and skeletal structure, circulation, digestion and major organs.

The trail is geared particularly towards pupils in the **P4 - S2** range.

The Body Bits Trail is curriculum linked to match 'A Curriculum for Excellence' covering outcomes in:

Science

>Biological Systems

>Body systems and cells

(The main themes explored within the outcomes are represented in the Body Bits Trail.)

HOW CAN I PREPARE FOR THE TRAIL?

We recommend teachers split their class between the adults in their party. Each adult should have a copy of the Teacher Guide that will allow the adult to provide pupils with additional information together with that which is displayed beside each exhibit.

WHAT DOES THE TRAIL INVOLVE?

There are two different Trail Guides: the **Teacher Guide** and the **Trail Guide**. The Teacher Guide consists of Trail information and the answers as well as some background information for each of the exhibits found within the trail.

Each pupil should have a copy of the Trail Guide. Each quesion in the guide corresponds to a particular exhibit. Trail-finders use information from the exhibits to answer the questions. Trail-finders should either circle the correct answer or write their answer in the space provided.

The Trail should take about **30 minutes** to complete.

The Body Bits Trail takes place on **Floors 1 & 2** of the Science Mall within Glasgow Science Centre. The Trail can be enjoyed at any time during your visit to Glasgow Science Centre. The Trail **compliments our Blood, Bile and Body Bits Show** and can be used either before or after the show. If you're not able to see the show during your visit or if the show isn't on at the time don't worry; the Body Bits Trail **also works well as a stand-alone activity.**

BACKGROUND INFORMATION

Exhibit 1 (Floor 1)

Take a Deep Breath

The lung on the left has been chemically treated to resemble a smoker's lung.

Cigarettes contain tar which when inhaled, sticks to tiny little hairs called Cilla, inside the lungs. Cilla act as little brooms sweeping away dirt and mucus. If the Cilla aren't functioning properly the tiny airways inside the lungs become blocked. The result is that smokers often cough a lot in order to remove the dirt and mucus that would otherwise be removed by the Cilla.

Exhibit 2 (Floor 1)

Zoetrope

If you look in the drum from above you will see a strip of still pictures of a bird at different stages of the flapping process. When you spin the drum and look through the slots, you see these pictures one after the other in quick succession. Your eyes and brain put the sequence of still pictures together and you see movement.

Television and cinema use the same idea to produce moving pictures. Your television shows 25 still pictures every second.

Exhibit 3 (Floor 1)

Bulging Biceps, Your Bendy Backbone, Inside Your Arm

Our spine is composed of a stack of 33 very short bones called vertebrate, with soft pads, discs, in between them. Ligaments, a connective tissue, hold the vertebrate together. This construction makes the backbone very flexible.

Muscles cannot push - they only pull. To make up for this, most of our muscles are arranged in pairs or groups so that they pull in opposite directions. Some types of muscles move without us thinking about moving them whilst others allow us to make our bones move when and how we want.

The hand and arm contain a surprisingly large number of bones, most of them in the hand and wrist. Our arm, wrist and hand usually contain 30 bones but many people have a few more or less. The big bones of the arm are the humorous (upper arm), radius and ulna (lower arm). The remaining 27 bones are all in the hand: carpals (near the wrist), metacarpals (forming the palm) and phalanges (fingers).

Exhibit 4 (Floor 1)

Getting Under The Skin

On average the human body has 5 litres of blood continually travelling through it via the circulatory system. The blood is moved around the body by the heart and travels around in tubes called blood vessels. Vessels carrying blood to the heart are called veins and vessels carrying blood away from the heart are called arteries.

This circulation is important since blood delivers oxygen to all the cells in the body. It takes less than a minute for your blood to supply oxygen to every cell in your body. Without this vital supply of oxygen the cells would die.

An increase in blood flow to an area results in the skin turning red, a decrease causes the skin to pale.

Exhibit 5 (Floor 2)

Get Organised

The exhibit involves correctly placing the organs into the body (in order of size: bladder, heart, kidney, liver, lungs, stomach and intestines).

The heart is a muscle and is actually located a little to the left of the centre of the chest.

The digestive tract is a long tube of organs including the oesophagus, stomach, and intestines. It runs from the mouth all the way to the anus. An adult's digestive tract is about 9m long!

Exhibit 6 (Floor 2)

X-Rays

Barium X-Rays, are often used to detect diseases of the digestive tract. As it enters the body, Barium coats the stomach, gullet or bowl and an outline of the organs appears in the x-ray highlighting any irregularities.

The gas trapped inside the cat absorbs the x-rays allowing us to see it. To remove the gas the cat must expel it either through it's mouth (burping) or its anus (flatulence).

BODY BITS TEACHER GUIDE

ANSWERS

Exhibit 1 (Floor 1)

TAKE A DEEP BREATH

When healthy, an adult human lung is about the same size and colour as that of what animal?

Pig

Healthy lungs enable you to take deep breaths. Use the plungers to find out which lung in this exhibit can take in the most air.

Left (Right)

Exhibit 2 (Floor 1)

ZOETROPE

The still pictures look like they are moving because:

a) A real bird is flapping inside.

b) Your eyes are blinking very quickly when you watch.

c) They are operated by a small projector in the drum.

(d) **Your eyes and brain put the still pictures together and you see smooth movement.**

Exhibit 4 (Floor 1)

GETTING UNDER THE SKIN

When people get a fright they sometimes go pale. This is because which part of the body reduces blood flow to the skin?

a) Blood Vessels b) Limbs (c) **Nerves** d) Muscles

Place your hand inside the monitor.

What parts of your hand have high blood flow?

Mark the areas with high blood flow on the diagram.

The location of the areas of high blood flow will differ from person to person.

Exhibit 3 (Floor 1)

BULGING BICEPS, YOUR BENDY BACKBONE, INSIDE YOUR ARM

Usually we think of bones as being hard and strong. So why is your spine or backbone bendy?

The spine isn't just one bone; it's made up of a stack of short bones with pads in between each.

Lift the lever to see your muscles working. Which set of muscles shorten and bulge to straighten your arm?

Biceps (Triceps)

Count the number of bones in the arm and hand. How many are there?

30

Exhibit 5 (Floor 2)

GET ORGANISED

Try to put all the organs in the right place. Which organ is about the size of your fist and sits behind the lungs?

The Heart

After it has dropped into your stomach, food mixes with which type of acid to produce chyme?

a) Lactic b) Glycolic

c) Hydrochloric (d) **Gastric**

Exhibit 6 (Floor 2)

X-RAYS

Have a look at the dog's intestines. What kind of drink has the dog been given?

a) Iodine b) Calcium

(c) **Barium** d) Vitamin C

What is trapped inside the cat's intestines and how will the cat get rid of it?

Gas. It will need to expel the gas!