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# Microbe Magic

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Winter 2008

## Hello everybody, GI Jake here!

Mike & I are very excited to bring you the latest edition of Microbe Magic. It is full of news, competitions, experiments and information that will keep you busy during the long winter months! Don't forget to check out the website at http://microbemagic.ucc.ie to keep up to date on all that's happening in Mike's world!


## WHAT'S BEEN HAPPENING?

**Clare Forde,** 4th class, Firmount National School, was the winner of the Microbe Magic Limerick Competition. Clare (pictured with Gráinne Heelan from the APC and her mum) won an MP3 layer and a cuddly GI Jake for her limerick on digestion.


**Clare's winning limerick**

*My digestion starts in my mouth,*
*And goes through my stomach, no doubt!*
*Crosses my stomach line,*
*Enters my intestine,*
*And it all finishes up down South!*

Just before the summer holidays, the APC took part in the Discover Science and Engineering Awards of Excellence ceremony in Cork. **Daniel Harrington** (pictured) of Gurranesig National School, Kilbrittain, was the winner of the APC word search competition. Daniel won a very large and cuddly GI Jake!


## COMPETITION TIME
## DESIGN A PLASTER AND WIN AN MP3 PLAYER

This edition of Microbe Magic is all about how skin forms a barrier to protect us. If we cut our skin, we often put a plaster on it to prevent germs from entering. Cut out the shape of the sticking plaster and design your skin protection cover!

Check out: http://microbemagic.ucc.ie for defence ideas!

**Send your entries to:** Mike, Alimentary Pharmabiotic Centre, 5.12 BioSciences Institute, University College Cork.

Please circulate to your friends

# World Digestive Health Day

The "Exploding Custard" shows were part of this year's World Digestive Health Day celebrations at the APC. These fast-moving, entertaining demonstrations of do-it-yourself kitchen-table science were exciting and interactive shows given by Ian Russell of Interactive Science Ltd UK. More than 450 students travelled to Fermoy from counties Cork, Limerick and Tipperary. The shows were generously sponsored by Yakult Ireland. Watch out for next year's show – who knows what we'll do next!

Sheila Morgan, APC and Teagasc, with presenter Ian Russell getting the full exploding custard experience!

# Warsaw Science Picnic

In June, the Microbe Magic crew travelled to Poland to the 11th Warsaw Science Picnic. There, they shared a stand with Science Foundation Ireland and the Irish Embassy. An estimated 100,000 people of all ages attended the outdoor festival with 250 stands from many countries. Young and old carried out our experiments, digesting starch with their saliva, as well as entering our wordsearch competition on the gastrointestinal tract which was written in Polish!

Karolina Dabrowska, winner of wordsearch competition, Sally Cudmore APC and Maurice O'Donnell, Second Secretary, Embassy of Ireland, Warsaw.

GI Jake at the busy Microbe Magic stand at Warsaw Science Picnic

# Teacher's Task

## The role of skin - the great defender!

**The aim** of this experiment is to examine what happens when your skin, your first line of defence, is broken.

**You will need:** 2 fresh apples (the same type), without any cuts or bruises; a warm spot (like a windowsill in the sun); pencil & paper.

**To start,** label one piece of paper 'Specimen' and the other 'Control'. On one apple only, make a small cut using the tip of the pencil. Place the cut apple on the 'Specimen' paper and the other on the 'Control' paper. Make sure both apples are in a warm spot. Keep a journal each day of how the apples appear.

**What's happening?** The apple's first line of defence, its skin, protects it from some pathogens. If its skin is cut, it is in pretty big trouble because those pathogens can get inside. In this experiment, the healthy 'Control' apple should stay pretty much unchanged. The 'Specimen' apple on the other hand should have big changes. Most likely it will be brown and mushy where pathogens like fungi and bacteria have entered through the cut and infected the apple. Your skin helps to stop invaders from entering your body. If pathogens do get in, your second line of defence fights to keep you healthy. It is really important to keep your skin clean, especially if you have a cut, and remember to leave it alone as it heals!

# GI AND SKIN WORDSEARCH

Find the words hidden in the grid. Remember, they can be in any direction (forward, backwards, upside-down!) and some do overlap! **small, anus, luke, gland, large, rectum, follicle, dermis, oesphagus, intestine, bifido, epidermis, mouth, bacteria, skin, subcutaneous, stomach, jake, nerve**

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# YOUR SKIN -
## THE LARGEST ORGAN IN YOUR BODY!

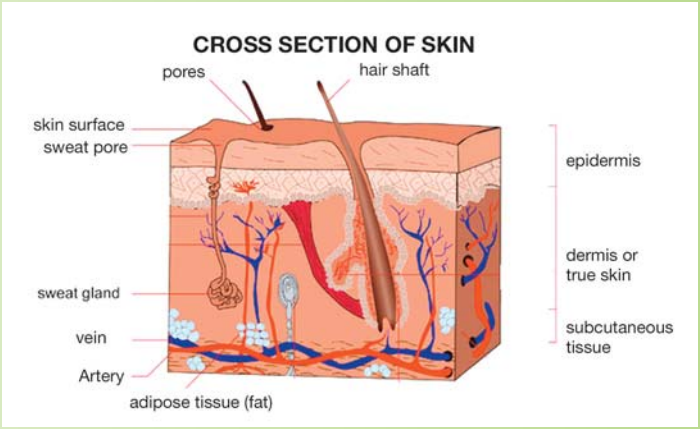
Skin is the largest organ in your body! Skin has several very important jobs, the most important of all is to make sure it holds all your inside bits, inside! It is very tough and acts as protection against microbes and other things that could damage your internal organs. It is also waterproof, which is why you don't swell up and slosh around when it rains or if you go swimming! One of the greatest things your skin does is to sense the world around you. Your skin tells you about temperature, shape and weight, as well as telling you if things are painful, sharp, hard, soft or cuddly!

**Your skin weighs about 12% of your total body!**

Your skin is made up of three thick layers. The outside layer that you see every day is called the epidermis. The epidermis is very tough and protects your body from harm and invaders. The skin cells of your epidermis are dead and lie flat. These are easy to rub off but your skin cells are constantly replaced without you even noticing, so you don't have any gaps!

Your epidermis also contains a pigment (like a dye) called melanin. Melanin gets darker when you are out in the sun to give the lower layers of your skin some protection from harmful rays. People with fair skin have less melanin and get sunburnt more quickly than people with more melanin. No matter how much melanin you have, it won't stop you from getting sunburnt.

**Your skin has about 20 different types of nerve endings, each sending a different message o your brain. The most common ones are those that can sense pressure, pain, heat and cold.**




The sun can be very damaging to your skin. You need to wear sunscreen, cover your head with a hat, put on sunglasses and a long-sleeved T-shirt to protect your skin from the sun. Remember the saying: Slip, Slop, Slap & Wrap! Slip on a T-Shirt, Slop on sunscreen, Slap on a hat & wrap around sunglasses!

**Your skin replaces itself entirely every two weeks.**

The middle layer of your skin is called the dermis. Your dermis is made up of a protein called collagen that makes it stretchy. Your hair follicles (the tunnel where each of your hairs grow) are in the dermis, along with blood vessels and nerves. Your dermis also has glands that produce sweat to help you keep cool and different glands that produce oils to keep your skin waterproof and your hair shiny.

**Your skin is thicker in places that need it, like the soles of your feet.**

The final layer of your skin is called the subcutaneous layer and it is where fat is stored. Some fat is very useful as it protects your organs when you bump into things or fall over and helps to keep you warm. Your skin is amazing so make sure you look after it well!

# ASK A SCIENTIST

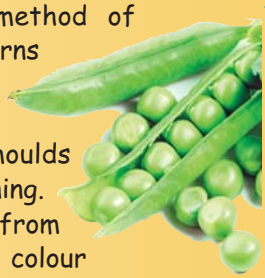
**Q. Why is snot green?**

A. Snot (or nasal mucus) comes in a variety of colours including bright green! The green colour is usually seen during an infection. It is caused by a type of white blood cell called a neutrophil. If you have an infection, the neutrophil travels to the site of the infection and tries to swallow up the bad bacteria (the pathogen). To work properly, the neutrophil uses a helper enzyme which depends on ferrous iron to work. It is the ferrous iron that gives the mucus its green colour as your body works to protect you!

**Q. How do bacteria know where to go?**

A. Bacteria usually move towards food or away from danger, because there are chemicals in the environment that they can sense. This is called chemotaxis (chemo = chemical, taxis = movement). Other bacteria contain tiny amounts of minerals that match up with the direction of earth's magnetic fields to help the bacteria figure out whether they're swimming up or down!

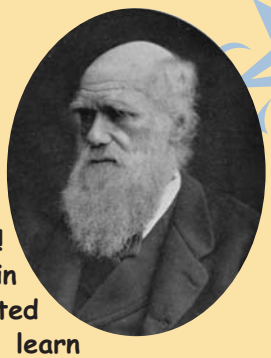
**Q. How does freezing preserve peas?**



A. Freezing is a superb method of preservation. Firstly, it turns the water in peas to ice and slows down or stops the growth of bacteria and moulds that can cause food poisoning. As soon as peas are picked from the plant, their flavour and colour start to deteriorate and enzymes work to break down many of the nutrients. This happens even when peas are frozen so most peas are first blanched (a very quick boiling process) to stop the enzymes working. Peas are then frozen immediately to ensure they keep as much of their sweet taste and nutrient content as possible. Most peas are blanched and frozen within a few hours of picking and can be kept in freezers for over a year (but do check the 'use by' date on the pack!).

**Ask your questions at:**
**http://microbemagic.ucc.ie/ask_scientist.html**

## Darwin 200



**Watch out for lots of events in 2009 to celebrate the 200th year anniversary of Charles Darwin's birthday! Darwin was the first to explain how every living thing is related to everything else. You can learn more at: http://www.darwin200.org**

Experimental techniques have changed a lot since Darwin's day. We are now able to see not only physical differences but differences in DNA, the genetic information in each cell. Chinese scientists, led by Dr Wang Jun, have recently worked out all of the DNA that makes up Jing Jing, the giant panda. Jing Jing will be pleased to learn that his DNA is very similar to that of dogs and to us humans!

GI Jake and Luke O'Cyte visited Jing Jing in Sichuan province in south west China last year with APC researcher, Ms. Fang Fang.

## Would you like an APC scientist to visit your school?

**Contact us at apc@ucc.ie or visit the website at: http://microbemagic.ucc.ie/teachers.html. This years presentation is "Our Bodies' Protectors – Keeping Us Fit 4 Life."**

## What about you?

Do you have ideas, suggestions or stories of the experiments you've tried for Mike? Let him know by **email at:** MicrobeMagic@ucc.ie or **by post at:** Mike, 5.09 BioSciences Institute, University College Cork.

The Alimentary Pharmabiotic Centre is a research centre funded by Science Foundation Ireland and is a partnership between University College Cork, Teagasc (Moorepark) and Industry.

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