

**Key Stages 2-3**

# That's Disgusting!

Science lessons that your  
kids won't forget!



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# Teachers' Notes

This book is designed to teach primary and lower secondary school students biology, in a memorable and entertaining way. It is packed with gruesome but educational information and practical activities which encourage children to engage with, and readily process each topic. Here is some further information on some of the topics in the book to deliver to your students and some suggestions on how to start lessons and how best to organise activities.

## Worm Watching, page 6

**Additional information:** Worms are very important to the environment. They play an important role in recycling decaying material. When they mix layers of soil and burrow, water drainage and aeration are improved. Without earthworms, it can take between 500 to 1000 years to produce 2.5 cm of rich organic top soil. With worms, this can be done in just 5 years.

**Idea:** Get your students to build a worm farm.

**Related topic:** Decomposition (page 38).

**Additional information:** The world record for the longest ear hair was broken in 2003 by a man from India (Radhakant Bajpai) The hair measured 13.2 cm.

**Idea:** Have your class measure this distance.

**Guinness book of records website:** → [www.guinnessworldrecords.com/records/human\\_body/extreme\\_bodies/longest\\_ear\\_hair.aspx](http://www.guinnessworldrecords.com/records/human_body/extreme_bodies/longest_ear_hair.aspx)

**For a revolting start to the lesson:** produce a cotton bud dipped in peanut butter and say that you love the taste of earwax.

## Hairball Horror, page 8

**Additional information:** The world record for the longest hair was broken in May 2004 by a Chinese woman (Xie Qiuping). She started growing her hair in 1973 when she was 13 and when the record was broken it measured 5.627 m.

**Idea:** Have your students measure this distance.

## Halitosis Heaven, page 10

Disclosing tablets and liquid can be purchased relatively cheaply from the chemist.

## Toilet Paper, page 14

**Useless information:** Apparently the US military camouflaged their tanks with toilet paper during the Desert Storm War in Saudi Arabia. I was unable to discover more – perhaps it's Top Secret!

## Vomit, page 16

**Additional information:** Food spends on average one minute in the mouth, four to eight seconds in the oesophagus, two to four hours in the stomach, and three to five hours in the small intestine. Depending on what it is, it can take between 10 hours and several days to pass through the large intestine! Some students may have seen an experiment on TV where people had to monitor how quickly sweet corn kernels passed through them. Cows bring up food from their stomachs to re-chew.

## Earwax, page 24

## What Am I?, page 26

**Useless information:** There are more red blood cells in your body than all the people who have ever lived on the Earth. Specially bred leeches are sometimes used after surgery to keep the blood flowing to an injury by preventing clotting. This can lower the risk of infection and aid with healing. A genetically engineered drug, based on the saliva of vampire bats has been used on stroke victims. In Victorian England people afraid of catching TB would drink glasses of fresh animal blood that they bought from the abattoir.

## To Wee or Not to Wee?, page 28

**For a revolting start to the lesson:** drink a glass of diluted apple juice but tell them it's urine.

**Idea:** Pour some dirty water through filter paper, a coffee filter or a paper towel to show how the kidneys filter out the dirt from the water.

## Decomposition, page 38

**VIP:** Stress that bags must be well-sealed and must not be opened during the experiment. Carefully dispose of all material at the end of the experiment. Fungi and bacteria are important decomposers. Warm and dark conditions help them to multiply.

**Extension:** Look at the effect surface area has on decomposition. Discuss ideal conditions for compost heaps versus ideal conditions for mummification.

**Related topic:** Worm Watching (page 6).

### **Tongue Twister, page 40**

**Useless information:** Chameleons can extend their tongues more than twice their body length. Giraffes have long (~ 46 cm) blue flexible tongues. The colour stops them getting sunburnt when stripping leaves from tall trees. The parasite *Cymothoa exigua* swim into the mouth of certain fish, chew their tongues to a stub and then attach themselves to form a “replacement tongue”.

### **Things That Live On You, page 46**

**Additional information:** There are over 240 parasitic diseases that you can pick up from other animals, including pets. Just by stroking or holding your pet, parasites can be passed on. Never allow animals to lick you in the face or mouth – you know what parts of their body they have used their tongues to clean! Small children are particularly at risk because they often put their hands in their mouths. Parasites can also be picked up by walking barefoot in areas where animals have defecated.

Cooking destroys many parasites. Eating raw meat (including fish found in some sushi), or under-cooked meat and not washing raw fruit and vegetables properly, increase your risk of picking up something nasty. Eating in areas where your food may have been exposed to vermin that carry

many parasites will do the same.

Public toilets contain masses of germs. Don't put your hands in your mouth or touch your face when you are in public places and wash your hands before you eat. Parasites are often transferred by sharing items with or being in direct contact with people who are already infected. Remember to use insect repellent because there are many parasites that can be passed on through insect bites. Untreated water may be contaminated water and contain parasites and untreated sewage. Don't drink, swim or wash your food in it.

### **Deadly and Dangerous, page 50**

**Some of the more bizarre diseases are:**

**Vampire Disease:** victims suffer pain from the sun

**Blaschko's Lines:** strange stripes all over the body

**Elephantiasis:** grossly enlarged limbs

**Walking Corpse Syndrome:** people who believe they have died

**Jumping Frenchman Disorder:** strange reflexes

**Pica:** sufferers are urged to eat non-food substances

**Alice in Wonderland Syndrome:** time, space and body image distortion

**Blue Skin Disorder:** people appear blue

**Werewolf Syndrome:** excessive hair

Curriculum Links

### Science Key Stage 2

- Sc1 Scientific enquiry
- Sc2 Life processes and living things
- Sc3 Materials and their properties
- Breath of study

### Science Key Stage 3

- How science works
- Organisms, their behaviour and the environment
- Materials, their properties and the Earth

*That's  
Disgusting!*

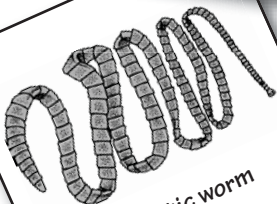
## Worm Watching



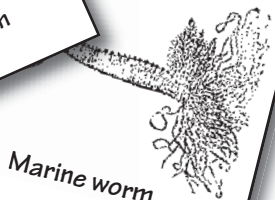
Forget Dr Who, earthworms have five hearts to circulate blood around their body. They have a fluid filled hydrostatic skeleton, so there are no crunchy bits to worry about if you're planning to break any worm eating records. Earthworms are hermaphrodites because each worm has both male and female reproductive organs. You still need two worms though, to make a baby worm.



Earthworm



Parasitic worm



Marine worm

You share the Earth with 20 thousand different types of worms. They are found everywhere, on land, in the water and even living as parasites inside other animals. (You may even have some wriggling silently in your intestine right now.)

Since nobody likes admitting to having parasitic worms, let alone producing them for a classroom practical, and because it's hard to keep marine worms alive in the classroom, we're going to concentrate on discussing and investigating the lowly earthworm.

Earthworms are made up of segments. Each segment is called an annuli and earthworms belong to the annelid family. The older the worm, the more segments it has.

These soft-bodied invertebrates are harmless herbivores. They have no sharp teeth and are relatively slow moving and without them, life on Earth would be quite different.

### Foul facts and gruesome gossip

Earthworms can be eaten as a nutritious snack. Worm bodies are 82% protein and are usually eaten boiled or baked.

- The world record for eating worms was broken in 2003 by a man in India. He ate 200 worms in 20 seconds.
- The Giant Gippsland Earthworm *Megascolides australis* is the longest earthworm in Australia. It can grow more than 3 metres in length and weighs about 200g.

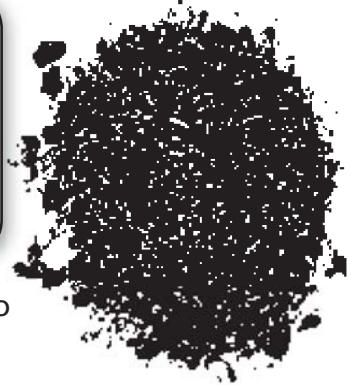
When you look at an earthworm you won't see any tiny eyes peering back at you (you don't need eyes when you mostly live in the dark). You won't see a nose or ears either. Earthworms can't see, hear or smell but they can sense vibrations and can detect light and temperature through special organs in their skin. When their nervous systems detect light or movement, the worms will instinctively move away.

Some people believe that seagulls tap their feet on the ground to fool earthworms into thinking that it's raining. When the worms come to the surface to avoid drowning, the birds eat them up.



# Investigating Earthworms

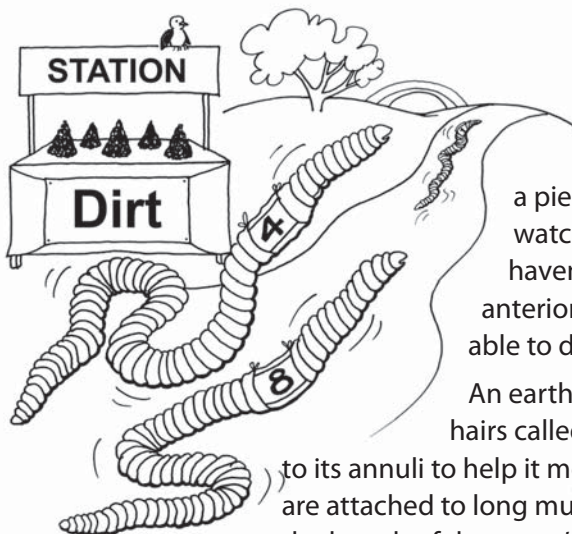
For this investigation, you will need to gently remove a worm from the school grounds and bring it into the classroom. Remember to be gentle when you handle any living creature – earthworms do have a nervous system and they can feel pain. Try to keep your worm in a cool spot and out of direct sunlight. Direct sunlight dries out their skin and makes their small breathing holes close up.



If you can, try to get hold of a magnifying glass so that you can inspect your worm in great detail.

Using a pencil carefully draw your earthworm in the space below.

1. Measure your worm and add a scale to your drawing.
2. Label the anterior (front) and posterior (end).
3. Try to count the number of annuli (segments) that your worm has and compare this with other worms being studied. Do you think your worm is old or young? \_\_\_\_\_
4. What colour/s is it? Is it the same colour all over? (Look at its front, back, top and bottom.)  
\_\_\_\_\_
5. Gently hold the worm – describe how it feels.  
\_\_\_\_\_



## Worm Olympics

Gently place your worm on a piece of paper and watch it move. (If you haven't labelled its anterior, you should be able to do so now.)

An earthworm has tiny hairs called 'setae' attached

to its annuli to help it move. The hairs are attached to long muscles that run the length of the worm's body. When the muscles contract and relax, the hairs dig into the ground and help the worm

to move. If you listen very carefully, you should be able to hear the little hairs scratching on the paper.

- Put a small obstacle (e.g. an eraser or pencil) in your worm's way. What happens? \_\_\_\_\_
- See if you can make one end of the paper shadier than the other. Where does the worm go? \_\_\_\_\_

When you've finished, carefully put your worm back in the place where you got it from – it must be hungry and exhausted from all the exercise.



## Gross Fact

### Humans can get hairballs too!

On the 26/11/2007, *The Australian* newspaper reported that surgeons in America found what looked like a large hairy rat inside the stomach of a patient. The "rodent" turned out to be a giant hairball that measured 38 cm X 17 cm X 17cm and weighed 4.5kg. It was so large that it had blocked the patient's stomach. The patient had a habit of chewing her hair. The scientific name for this habit is trichophagia and a human hairball is called a trichobezoar.

Some people adore cats and some people don't like them at all. Whatever you personally think, most people can't deny that cats are fastidiously clean creatures – spending large parts of the day grooming.

If you are on good terms with a cat, you will see that it has two types of fur – a short dense undercoat and an outer or overcoat, made of much longer hairs.

Cats use their raspy tongues and masses of saliva to keep their fur in order and in the process manage to swallow lots of hair.

Obviously, the fluffier the cat, the more hair it has and the more hair it consumes. Even short, sleek cats can lose extra hair when they moult, e.g. in spring cats lose their warm winter coat.

Hair is made of a tough protein called keratin. Keratin isn't easily digested by a cat's stomach. Most of the time, hair passes through a cat's digestive system and ends up mixed in with its faeces, but when a cat swallows too much hair, rather than walking around full of feline fur, the cat simply vomits it back up as a hairball. Lovely!

Regular brushing of cats and special hairball reducing foods can help with this problem. Another way to make sure your pet never suffers from this condition is to buy a hairless cat.



You don't have to waste time chewing your hair to make your own revolting hairball - simply follow the recipe below. Unfortunately, supplies of some ingredients are running low. Today, stomach acid (which has a pH between 1 and 2 and is used to break down food and kill germs) will be replaced by vinegar.

Stomach mucus (which lines and protects the stomach from strong acid) will be replaced by a mixture of gelatine and golden syrup. Happy cooking!

#### Equipment:

- 2 envelopes of unflavoured gelatine
- hot water
- golden syrup
- vinegar
- tin foil or plastic wrap
- hair, e.g. cat, possum, fake, human (you lose up to 100 a day – so you should be able to spare a few.)

#### Method

1. Stir the gelatine into ½ cup of very hot water.
2. Add 3 tablespoons of golden syrup.
3. Add 1 teaspoon of vinegar.
4. Mix until it forms long sticky strands.
5. Sprinkle some of the hair in a pile on the foil or wrap.
6. Gently pour the gooey mixture on top of it.
7. Roll your creation into a little sausage shape.
8. Coat with the remaining hair.

→ While you're waiting for your hairball to dry, complete the acrostic puzzle on page 9.



# Hairball Acrostic Puzzle

Read the clues to help you to complete the puzzle, then circle a letter in each answer to vertically spell **HAIRBALL HORROR**

## Clues

1. Part of the digestive system that's full of strong acid.
2. Small quantities of a cat's hair ends up in these.
3. If you chew your hair you could end up with one of these inside you.
4. You can lose up to this many hairs each day.
5. If you are \_\_\_\_\_ you will never suffer from hair balls.
6. A mild acid used to day.
7. One ingredient used to replicate mucus.
8. Spit or dribble.
9. Protects 1 across from acid.
10. A fur covering.
11. Rats and mice belong to this group.
12. The way a cat's tongue feels.
13. The fastest way to get rid of a hairball.
14. A tough, indigestible protein.

1.

2.

3.

4.

5.

6.

7.

8.

9.

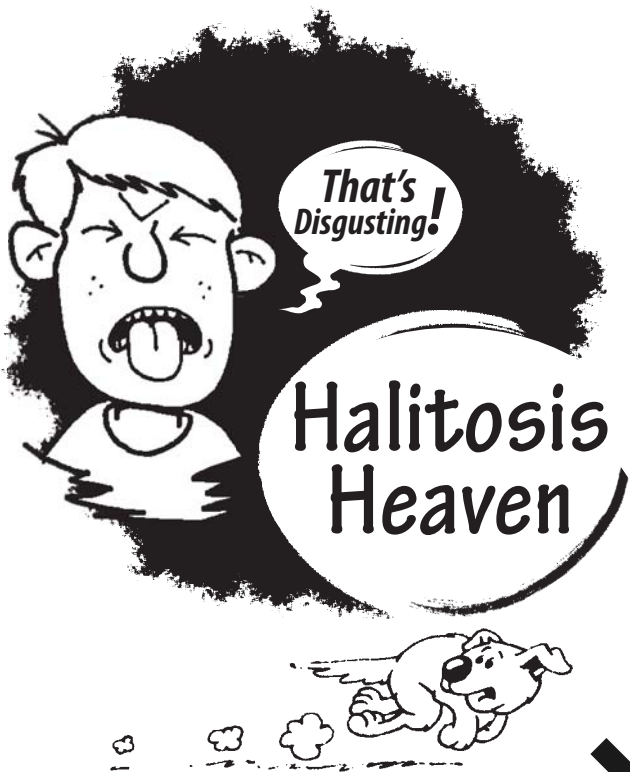
10.

11.

12.

13.

14.



It's not nice to have a conversation with someone who has "dog's breath" and heaven forbid that anyone should think that your exhalations should pong like the rubbish bin the morning before it's collected.

Bad breath is one of those things that most people won't tell you about – you may just notice those around you leaning away or avoiding up close and personal conversations.

Unfortunately, many things can cause halitosis (bad breath) and most people suffer from it at some time during their lives.

Most people know that eating certain things can affect how your breath smells.

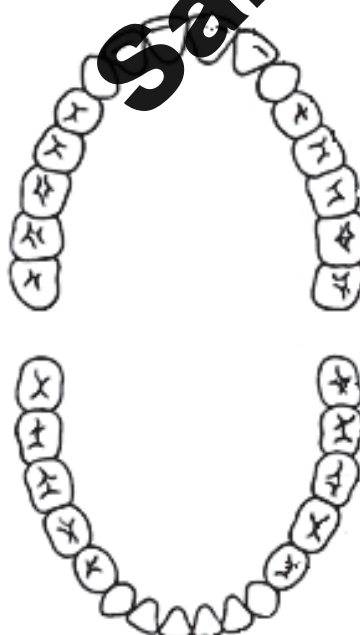
Complete the following table with foods that you know cause:

Sweet breath	Dog's breath

Fortunately, bad breath caused by food is just temporary – stop eating the food and the smell disappears relatively quickly.

Billions of bacteria live inside your mouth – they cover your teeth and live in the fuzzy white coating that you can see at the back of your tongue. If you don't clean your mouth properly, these bacteria can cause bad breath.

Some people take mouth hygiene very seriously and use tongue cleaners to gently scrape off the furry bacteria.



Disclosing tablets or solution can show if you haven't been brushing your teeth properly. They turn the gunk still stuck to your teeth bright pink. Your teacher may have some for you to try. Use the diagram of teeth to show where you need to improve your brushing.

