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PHOTOCOPY MASTERS

Science

Disgusting Science

For Upper Primary

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mini e-book

PHOTOCOPY MASTERS

Contents

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Hairball Horror

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.

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.

Making Hairballs

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 hairballs.
6. A mild acid used today.
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.

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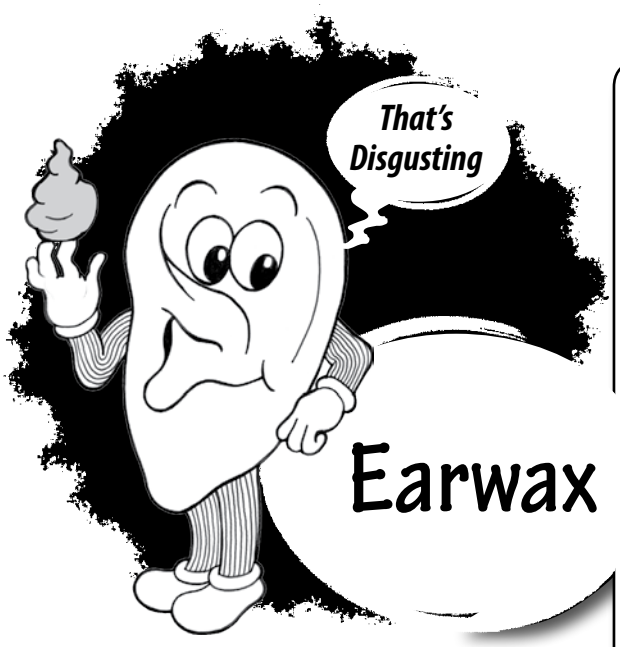


Earwax

Has anyone ever said to you, "What's going on inside your head?" Read on, and you'll be able to give them an answer.

Right now there are 2000 tiny glands inside your ear busily producing wax (or cerumen). Everyone has earwax.

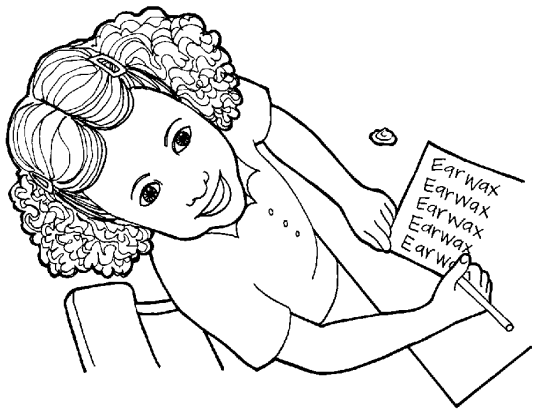
Tick the box that best describes your earwax.

- ❑ **wet** = oily, sticky and brown.
- ❑ **dry** = sticky, brittle and grey.

Your genetic background determines the type of wax that you have. People from European or African backgrounds tend to have wet wax, while Asian and Native Americans have dry wax. Researchers have used earwax types to track human migration patterns over the world.

You may have heard the expression, "Never stick anything in your ears smaller than your elbow."

Family history aside, earwax has an important function. It protects you against bacteria, small insects and fungi that may get into your ear canal and cause damage. These things become stuck in the sticky wax. The wax naturally dries up and drops out on your clothes, on your pillow at night or on the desk of the person sitting next to you.

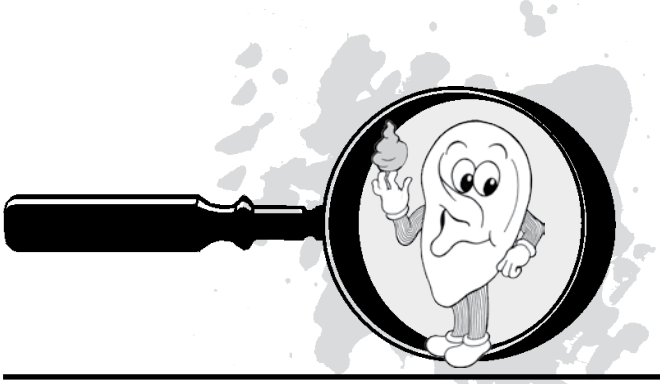


Sometimes your ears produce extra wax and this can make it difficult to hear. If this happens, don't try to clean out the wax with a cotton bud or anything else because you may end up pushing the blockage further down the ear canal and up against the eardrum. This can make the situation even worse.

Other mammals have earwax too.

Earwax can be used to tell the age of some species of whales. Whales have ears but the ear canal is closed to the outside. Every year wax builds up inside whales' ears and forms a layer. Just like counting the rings inside the trunk of a tree, the number of waxy layers can be used to tell how old whales are. The biggest snag with this method is that the whales have to be dead to count them!

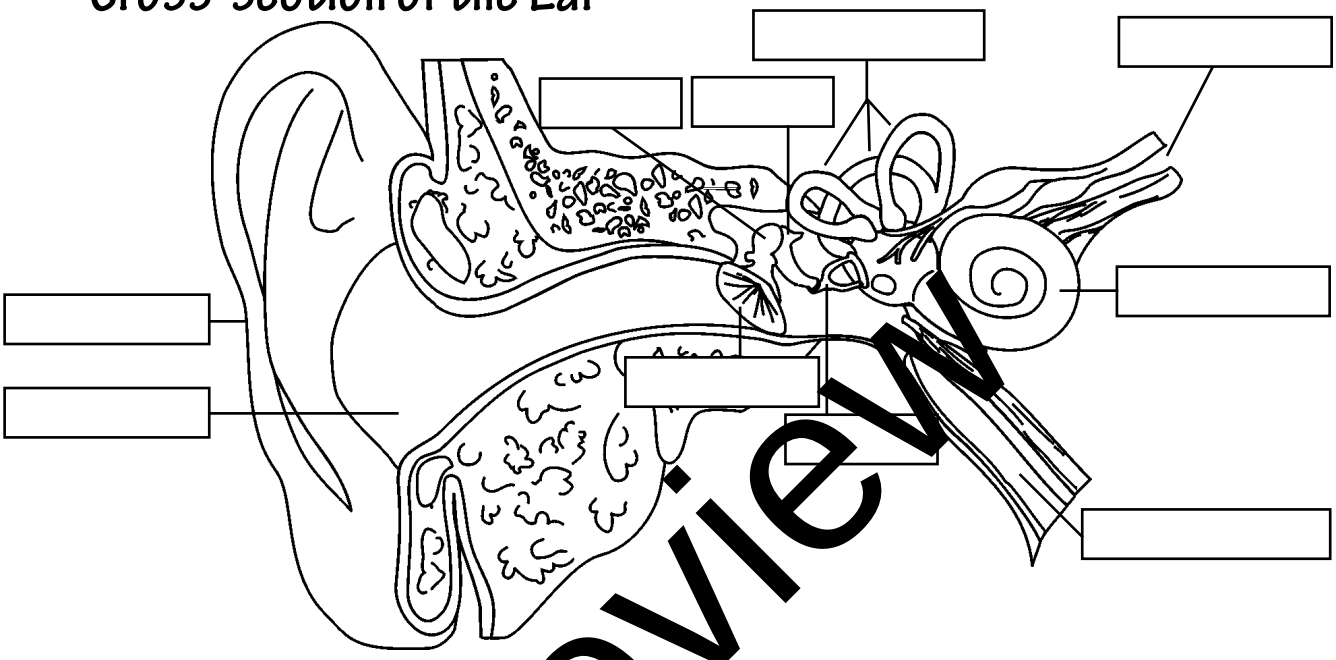
Ear mites sometimes trouble cats and dogs. The larvae of these lovely creatures happily feast on earwax and can cause irritating ear infections. Fortunately, the mites rarely spread to humans.



More Earwax

Read the information below to find the area on the diagram where your earwax lies. Colour this area then label parts of the outer, middle and inner ear.

Cross-section of the Ear



Outer ear

Pinna –Easily seen. Although it can be decorated with jewellery, its main function is to collect sound and funnel it into your outer ear canal.

Outer ear canal – Lined with sticky wax. Sound passes along this tube to reach your eardrum.

Eardrum – This thin membrane vibrates when hit by sound waves travelling along the outer ear canal reach. It separates the outer and middle ear.

Middle ear

(Contains 3 tiny bones that start to move when the eardrum vibrates.)

Hammer - Passes vibrations from the eardrum to the anvil.

Anvil - Passes vibrations from the hammer to the stirrup.

Stirrup - U-shaped and the smallest bone in your body. (It is 0.25 to 0.33 cm long.) It passes vibrations from the stirrup to the cochlea.

Eustachian tube - A small tube that joins your middle ear with the back of your nose. It keeps the pressure in the middle ear and the outside air the same and is responsible for the popping sound that you sometimes get when you quickly change altitude.

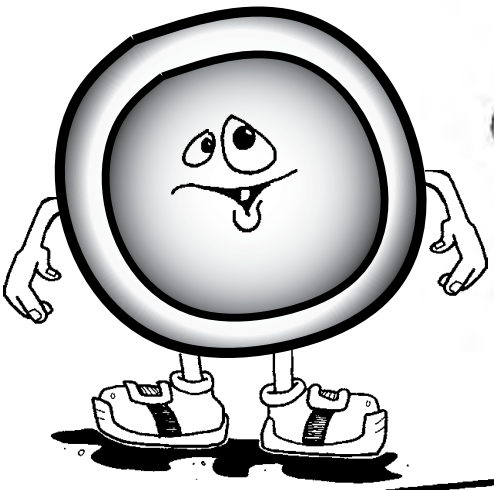
Inner ear

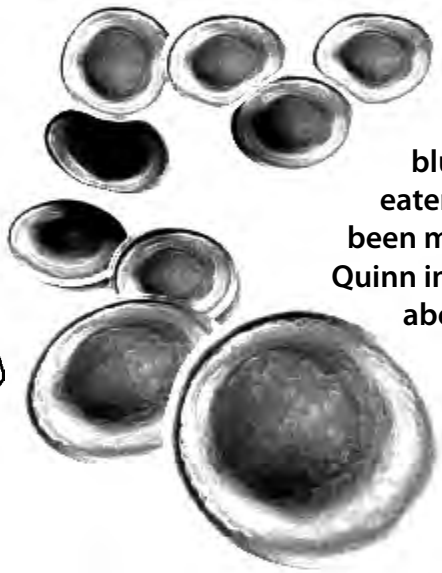
Semicircular canals – Help you balance. They look like three loops and are attached to the cochlea.

Cochlea – A snail shaped structure. Tiny hairs (cilia) inside the tube move when vibrated and send messages to the nerves.

Nerves - These carry messages to the brain.

What am I?





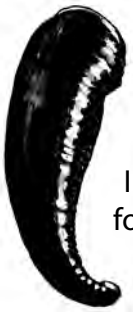
I am a liquid,
I come in a variety of colours, including red (in humans), white (in cockroaches) and blue (in lobsters). I have been eaten, I've been drunk, I've even been made into a sculpture by Mark Quinn in 1991 and right now you have about 13 drink cans worth of me pumping through your body.

Feel me move by placing two fingers on the side of your neck, just under your jaw, below your ear.

As I travel around the circulatory system, I help transport oxygen, carbon dioxide, absorbed food, waste products and hormones. I keep your body temperature relatively constant and help you to fight against infection.

I'm a mixture, containing different types of cells, platelets and plasma.

When you're feeling ill, I might get checked. Too many white cells might mean that you have an infection, too few red cells could mean that you have haemia.



I make a good source of protein for some creatures. Vampire bats (*Desmodus rotundus*), really do drink me after using their heat sensors and their sharp front teeth to find and nip the veins of sleeping cows. A chemical in bats' saliva numbs the wound and stops me clotting. As I ooze out, bats lick me up.

Leeches, mosquitoes, sandflies, bed bugs and ticks also find me tasty. If you like cooking, try mixing me with milk like the Massai in Africa or bake me into a black pudding (a traditional dish from England).

In humans I come in 4 main types: A, B, O and AB.

I can be donated, stored and after careful matching and screening for diseases, I can be transfused in an emergency from one individual to another.

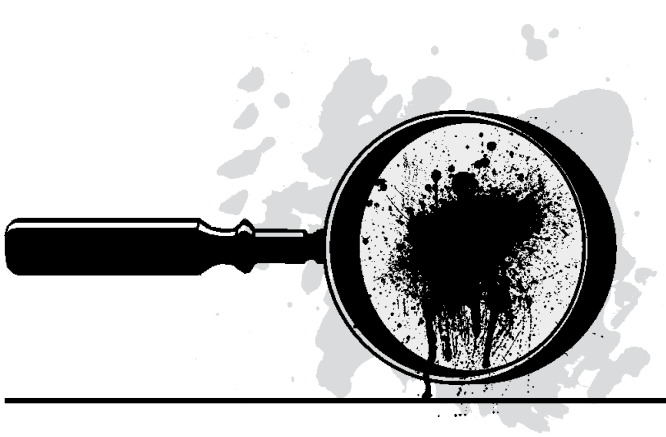
Forensic scientists can use me to solve crimes.

Although essential for life in many, (but not in all animals), I can carry killer diseases such as AIDs, malaria and the plague.

Surface too quickly from an undersea dive and little bubbles of gas will appear in me causing "the bends."

I am

_ _ _ _ _ _



What Am I? Acrostic Puzzle

Read the clues to help you to complete the acrostic puzzle.
Then circle a letter in each answer to vertically spell THICKER THAN WATER.

1. Created by Mark Quinn.
2. A small aquatic sucker.
3. Your heart and blood vessels form this system.
4. Prevented from happening by chemicals in vampire bats' saliva.
5. Real vampire bats don't suck blood - they _ _ _ _ it.
6. May be detected by too many white blood cells.
7. The number of human blood groups.
8. Forget royalty. This creature really does have blue blood.
9. The volume of your blood converted to drink cans.
10. A killer disease spread by mosquitoes.
11. An important gas needed to keep you alive.
12. The colour of cockroach blood.
13. This African tribe finds blood a good source of protein.
14. The giving of blood from one person to another in an emergency.
15. Kept relatively constant by the movement of blood.
16. Forensic scientists aim to solve this.

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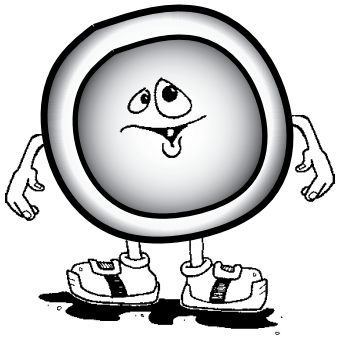
16)

Don't like the real stuff – try this instead.



Equipment:
75g cornflour, 75mL water, 75mL golden syrup, 3 teaspoons red food colouring, 1 teaspoon green food colouring, a container for mixing, mixing implement (spoon, stick, etc.)

Method

1. Mix corn flour and water together in a bowl or jug.
2. Add the golden syrup.
3. Add the food colouring.
4. Stir and enjoy.

Decomposition

You can guarantee that someone in your class is conducting their own decomposition experiment right now. You may not know it, they may not know it, but somewhere, in someone's locker, in someone's school bag or under someone's bed, something is rotting.

Like many great scientists, the individual may have begun by asking questions: "What will break down faster, my tuna sandwiches or my bruised banana?"

"Will I get better results if I carry out this experiment in the warm summer months?"

"How long before the smell is detectable by everyone else?"

As we all appreciate, these enquirers often get distracted and only remember their efforts to push back the frontiers of knowledge when their parents are heard going ballistic or the school caretaker forces open their locker because of the pong.

Experiment

Today, is your chance to replicate a decomposition experiment but without the shouting, the angst and the serious disinfecting.

You will be working in small groups to study decomposition in a controlled manner. You will be observing and recording what happens at each stage of your experiment. Your experiment will run over two weeks.

Aim: Observe decomposition in different environments.

Equipment: *One slice of bread cut into 4, 1 piece of fruit cut into 4, 4 snap lock bags, permanent marker for labelling. (Masking tape is optional.) 2 photocopies of page 39.*

Method:

1. Number the bags 1-4 and write DO NOT OPEN on each one.
2. Label the bags with today's date and the name of your group.
3. Place a piece of bread and a piece of fruit into each bag.
4. Seal the bags shut – seal with tape if necessary. It is very important that you do not open the bags once they have been sealed.
5. Place each bag in the following areas:
   - **Bag 1: dark and warm**
   - **Bag 2: dark and cool**
   - **Bag 3: light and warm**
   - **Bag 4: light and cool**
6. Observe the bags over the next few weeks. Draw what you see on the table provided.
7. Label a bag 'fungi' if it looks fuzzy or 'bacteria' if it looks slimy.
8. Always wash your hands after handling the bags.
9. Record your observations in the table provided on page 39.

Decomposition Results

Decomposition Results for:

AFTER WEEK 1	
Bag 1: dark and warm	**Bag 2: dark and cool**
Bag 3: light and warm	**Bag 4: light and cool**

AFTER WEEK 2	
Bag 1: dark and warm	**Bag 2: dark and cool**
Bag 3: light and warm	**Bag 4: light and cool**

Questions

Which broke down faster? The bread or the fruit? _____

Circle the most accurate word:

The warmer the temperature the **faster/slower** things broke down.

The lower the light level, the **faster/slower** things broke down.

Things That Live On You

Love plants or animals or perhaps you're looking for a new pet? A parasite might be just the thing for you.

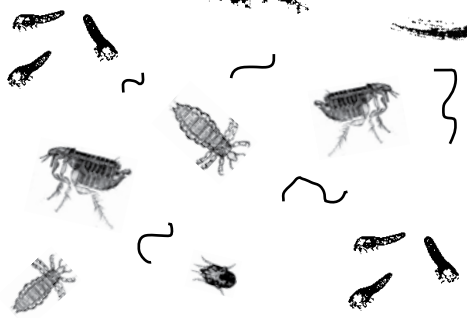
Parasites are animals and plants that are cleverly designed to live on and feed off other living things. The things that they live on or in, are called hosts.

Parasites are very common – in fact you may already be a host to one or two.

Fill in the table below to discover if this might be the case. Try to be truthful with your responses. (Tick yes or no.)

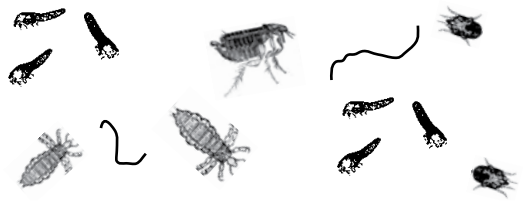
HAVE YOU EVER…?		
1	Had a pet or played with one during your life?	❑**Yes** ❑**No**
2	Walked barefoot on warm or sandy soil?	❑**Yes** ❑**No**
3	Eaten sushi, uncooked meat or undercooked meat?	❑**Yes** ❑**No**
4	Eaten raw eggs or oysters?	❑**Yes** ❑**No**
5	Eaten salads or fruit which hasn't been washed properly?	❑**Yes** ❑**No**
6	Eaten somewhere where flies may have landed on your food?	❑**Yes** ❑**No**
7	Eaten in places where mice, rats or cockroaches live?	❑**Yes** ❑**No**
8	Eaten in places where rubbish is not covered?	❑**Yes** ❑**No**
9	Shared drinks or food, shaken hands or kissed someone who may have touched something that has had parasites on it?	❑**Yes** ❑**No**
10	Been bitten by an insect or another animal?	❑**Yes** ❑**No**
11	Travelled or lived in less developed countries?	❑**Yes** ❑**No**
12	Washed your hands in or drunk untreated water from a river, stream or lake?	❑**Yes** ❑**No**
13	Swum in areas where the water may be contaminated?	❑**Yes** ❑**No**
14	Used a public toilet?	❑**Yes** ❑**No**
15	Come into contact with children?	❑**Yes** ❑**No**
16	Had someone in your family who has had parasites?	❑**Yes** ❑**No**

Your teacher will go through the list and let you know how you scored.

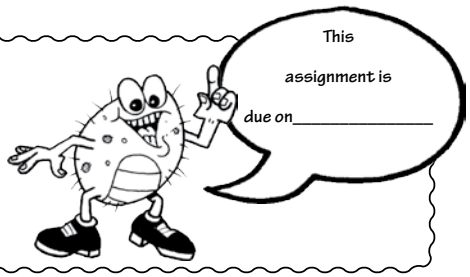


There are masses of human parasites to catch. Some are relatively harmless like the tiny Demodex mite that lives in the hair follicles of everyone's eyelashes and eyebrows. Some, like ringworm can be irritating but are easy to get rid of. While others such as the parasite Plasmodium falciparum that causes malaria, kills millions of people each year.

Ectoparasites live on the outside of your body. These include: head lice, fleas, athlete's foot and scabies. Endoparasites prefer to live inside of you, e.g. tapeworms, pinworms, roundworms and giardia.



Profile of a Parasite



Choose a parasite then complete the table below.

Name of parasite_____

Scientific name _____

Reason for choice

- ❑ v l r ob w o r r i e d v l r sb g o t t h e m
- ❑ v l r ob w o r r i e d y o u m i g h t g e t t h e m
- ❑ o t h e r : _____

Please tick

- ❑ E c t o p a r a s i t e
- ❑ E n d o p a r a s i t e

Draw parasite ➔

Lifecycle of Parasite

Symptoms caused by the parasite to its host

_____

How to prevent becoming a host

_____

_____

_____

_____

How to get rid of parasite

_____

_____

_____

_____

References

Answers

Page 4

stomac**H**; f**A**eces; tr**I**chobezoar; hund**R**ed; **B**ald; vinega**A**r; ge**L**atine; sa**L**iva; **H**abit; c**O**at; **R**odents; **R**aspy; v**O**mit; ke**R**atin

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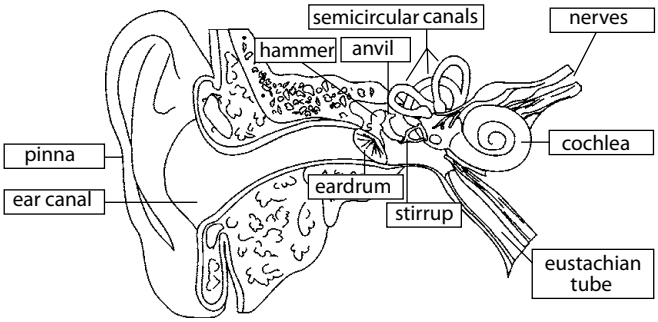

Page 8

I am BLOOD

Page 9

T sculp**T**ure
H leec**H**
I c**I**rculatory
C **C**lotting
K lic**K**
E inf**E**ction
R fou**R**

T lobs**T**er
H t**H**irteen
A m**A**laria
N oxyge**N**

W **W**hite
A M**A**ssai
T **T**ransfusion
E t**E**mperature
R c**R**ime