



SCIENCE NEWS: "WHY DOGS SHAKE" & "HEATING UP"

WHY DOGS SHAKE

Science journalists Liz Kalaugher and Matin Durrani have been spending some time investigating how physics crops up in the daily lives of our planet's varied animal life. You might never have wondered why a dog shakes when it's wet, but the answer shows that a pup's skin has some very interesting qualities...

You're standing by a pond or a lake, then brrrr, a spray of water hits you as a dog bounds out of the water and shakes itself like a shower hose on the loose! But the dog isn't doing it to annoy – biology and physics are to blame.

You know how your sweat cools you down on a hot day? It's because the liquid draws heat energy from your body to turn itself into water vapour in the air. Exactly the same thing happens to a wet dog – only it's dangerous because so much more water clings to its hairs. And if the dog chills off too far, the chemical reactions that keep it alive won't work.

So a wet animal must take action or it could die. But it can't use a towel or a hairdryer, like we do. Instead it shakes itself dry, and it doesn't care if you're standing next to it or not!

One day, David Hu of the Georgia Institute of Technology in the US was watching his toy poodle Jerry

do just this. He wanted to know more, so he taped pink plastic drinking straws to the fur on the back of a Labrador retriever and filmed it with a high-speed camera.

As the dog shook its coat, the pink drinking straws moved from the animal's back to one side of its chest then round to the other side, travelling through an astonishing 90 degrees to either side of the dog's backbone. That's like us shaking our belly button round to our hips. Dogs have extra floppy skin that they can rotate through 60 degrees to either side of their spine; they get the rest of the twist by spiralling their backbone. That means dogs can spin nearly three-quarters of the water from their soggy coats just by shaking their bodies 4.5 times each second. It takes at least a thousand times less energy to do this shake than to replace the heat the dog would lose if the water evaporated – the dog would need to burn the calories in around a third of a can of dog food to warm itself up again.



HEATING UP

Getting cold isn't the only danger for animals. There's also the risk of over-heating, especially for female mosquitoes. These insects love nothing better than human blood, which is packed with goodies to help them lay eggs. They suck out your blood by sticking a long tube, known as a proboscis, into your skin and rummaging about.

But sucking blood is risky for the mosquito. While it's drinking, the insect's a sitting target. One quick flick of your hand and it's dead. To avoid being killed, the mosquito guzzles blood as fast as it can, sometimes trebling its weight in one go. Problem is, our blood is hot: it's about 37°C. As all that blood gushes into her body, the bloated mosquito gets too hot for comfort.

So to cool off, some species of mosquito have a trick: they squeeze out a drop of blood and water from their



bums while they're drinking. The bright red drop hangs off the insect's bottom like a giant beach ball.

It looks disgusting but it's clever. As the water in the drop evaporates, it cools and draws heat away from the mosquito's body back to a safe temperature. And it lives to eat another day.



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Carefully read this week's 'WHY DOGS SHAKE' and 'HEATING UP' articles and then answer the following questions.

QUESTIONS ON "WHY DOGS SHAKE"

Part A: Find and explain the facts

- A1.** Who are Liz Kalaugher and Matin Durrani?
- A2.** How does sweat cool you down on a hot day?
- A3.** What did David Hu of the Georgia Institute of Technology in the US do to a Labrador retriever?

Part B: Deduce and infer information

- B1.** Why does a wet dog have to take action to get dry?
- B2.** Why do dogs have extra floppy skin?
- B3.** Why doesn't a wet dog just let the excess water evaporate?

Part C: Analyse the writing and presentation

- C1.** This article about why dogs shake is in SCIENCE NEWS and so the process is explained scientifically. How does the writer make the information engaging for *First News* readers?

QUESTIONS ON "HEATING UP"

Part A: Find and explain the facts

- A4.** Why do female mosquitos love human blood?
- A5.** Why does the mosquito "guzzle blood as fast as it can?"

Part B: Deduce and infer information

- B4.** Why is it significant for the mosquito that human blood is hot: about 37°C?
- B5.** Explain how some species of mosquito cool off.

Part C: Analyse the writing and presentation

- C2.** Identify the simile used by the writer and comment on the effect of its use.

QUESTION ON BOTH ARTICLES

- C3.** Both articles have an accompanying picture. Which one do you think is more likely to hook the reader and why?



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AIM OF THE NEWS COMPREHENSIONS

News reports are unique non-fiction texts. Being real, they naturally engage students, and with the range of topics that are covered, help to develop pupils' knowledge and understanding of the wider world outside the classroom.

The reports are ideal for short, focused comprehension or discussion activities. Along with the opportunity to find fascinating facts and appreciate the opinions of those involved, there is plenty to be inferred and deduced to understand in more depth what is being reported. Like authors, journalists play with language, so news 'stories' are rich nuggets of text to investigate and provide the opportunity for literacy programmes.

TEACHER ANSWER GUIDE

The teacher answers are intended to provide a guide to the reading skill each question is practising. Suggestions are given for a starting point for responses that students would be expected to give at the start of KS3. Further suggestions then give fuller, more developed responses that students will work towards by the end of KS3, in preparation for the non-fiction elements of GCSE English Language.

TEACHER ANSWERS

Questions on "WHY DOGS SHAKE"

Part A

A1. Who are Liz Kalaugher and Matin Durrani?

READING SKILL-Find and explain information

Possible answer

- Liz Kalaugher and Matin Durrani are science journalists.

Development

- They have been spending some time investigating how physics crops up in the daily lives of our planet's varied animal life.

A2. How does sweat cool you down on a hot day?

READING SKILL-Find and explain information

Possible answer

Expected response

- Your sweat cools you down on a hot day because the liquid draws heat energy from your body to turn itself into water vapour in the air.

A3. What did David Hu of the Georgia Institute of Technology in the US do to a Labrador retriever?

READING SKILL-Find and explain information

Possible answer

Starting point

- David Hu taped pink plastic drinking straws to the fur on the back of a Labrador retriever and filmed it with a high-speed camera.

Development

- He did this because he had noticed his toy poodle Jerry shaking his wet fur and he wanted to know more about it.

Part B

B1. Why does a wet dog have to take action to get dry?

READING SKILL- Infer information and justify with evidence from the text

Possible answer

Starting point

- A wet dog has to take action to get dry because otherwise it could die.

Development

- In the same way as when humans sweat, the water on a wet dog draws heat energy from the dog's body to turn itself into water vapour. However, because of its fur, much more water clings to the dog. Therefore, the process can make the dog too cold and consequently, the chemical reactions that keep it alive won't work. In order to protect itself, the dog has to shake off the excess water.

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B2. Why do dogs have extra floppy skin?

READING SKILL- Infer information and justify with evidence from the text

Possible answer

Starting point

- Dogs have extra floppy skin because it helps them to spin the water from their coats.

Development

- During David Hu's experiment with the Labrador, the pink straws moved from the dog's back to one side of its chest and then round to the other side, travelling through 90 degrees to either side of the backbone. The skin can rotate through 60 degrees to either side of the dog's backbone and they get the rest of the twist by spiralling their backbone. Therefore, dogs have this extra floppy skin because it means that they can spin nearly three-quarters of the water from their fur just by shaking their bodies 4.5 times each second.

B3. Why doesn't a wet dog just let the excess water evaporate?

READING SKILL- Infer information and justify with evidence from the text

Possible answer

Starting point

- A wet dog doesn't just let the water evaporate because that uses up more of the dog's energy.

Development

- It takes at least a thousand times less energy to do this shake than to replace the heat that the dog would lose if the water evaporated. The dog would need to burn the calories in around a third of a can of dog food to warm itself up again.
- Also, it could be dangerous for the dog if it got too cold in the process.

Part C

C1. This article about why dogs shake is in SCIENCE NEWS and so the process is explained scientifically. How does the writer make the information engaging for First News readers?

READING SKILL- Recognise effect of language choices

Possible answer

Starting point-one or two points with simple comment

Developed response-several points with detailed explanation

- The writer starts with describing a hypothetical situation. It seems a bit like they are telling a story. As most readers will be familiar with the situation being described then it is likely to capture their attention.
- The vocabulary is informal for example the use of "brrrr." Therefore, although some of the information is quite detailed, the tone of the article is informal and so it isn't intimidating.
- The writer appeals to the reader through the use of direct address and a question. The reader is asked: "You know how your sweat cools you down on a hot day?" This makes the reader focus because it is though they are being asked the question personally. The way in which the writer asks, "You know" is also conversational in style which is engaging for a young readership.
- The writer uses analogies to help the reader to understand the information. For example, the writer helps the reader to understand the astonishing movement of the dog's skin by describing it as "like us shaking our belly button round to our hips."

Questions on "HEATING UP"

Part A

A4. Why do female mosquitos love human blood?

READING SKILL-Find and explain information

Possible answer

Starting point

- Female mosquitos love human blood because it contains the goodness that they need to help them to lay eggs.

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Development

- They get the blood by sticking a long tube, known as a proboscis, into the skin of a human and rummaging about.

A5. Why does the mosquito "guzzle blood as fast as it can?"

READING SKILL-Find and explain information

Possible answer

Starting point

- A mosquito has to "guzzle blood as fast as it can" because otherwise it might get killed.

Development

- Whilst a mosquito is drinking it is a sitting target and it can easily get flicked away or squashed.

Part B

B4. Why is it significant for the mosquito that human blood is hot: about 37°C?

READING SKILL- Infer information and justify with evidence from the text

Possible answer

Expected response

- It is significant for the mosquito that human blood is hot because the mosquito has to drink very quickly. Therefore, the large volume of blood gushing into the mosquito's body can cause it to overheat.

B5. Explain how some species of mosquito cool off.

READING SKILL- Infer information and justify with evidence from the text

Possible answer

Starting point

- Some mosquitos squeeze a drop of blood and water out of their bottoms whilst they are drinking in order to cool off.

Development

- As the water in the drop evaporates, it cools and draws heat away from the mosquito's body back to a safe temperature.

Part C

C2. Identify the simile used by the writer and comment on the effect of its use.

READING SKILL- Recognise effect of language choices

Possible answer

Expected response

- The writer describes the blood and water bubble that hangs off the bottom of some mosquitos to help them cool off as being "like a giant beach ball."
- The simile helps the reader to understand the size of the blood bubble in relation to the mosquito's body. The idea of it being like a big beach ball is also quite amusing.

Question on both articles

C3. Both articles have an accompanying picture. Which one do you think is more likely to hook the reader and why?

READING SKILL- Identify benefits of text organisation and presentation.

Possible answer

Starting point

- The picture of the mosquito is the more likely of the two pictures to hook the reader because it is the more unusual. People are used to seeing pictures of dogs. Even a picture of a dog shaking the water from its coat is not particularly out of the ordinary.

Development

- However, mosquitos are tiny and so it is quite rare to see one close-up. Furthermore, this picture is particularly interesting because it shows a mosquito drinking blood and producing a blood and water bubble from its bottom

in order to stay cool. As the writer asserts, the technique is quite “disgusting” but it is also clever and seeing photographic evidence of it is strangely fascinating.

(Reward alternative answer if a convincing explanation is provided.)