The WONDER WEEKLY

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Published by the Peter Underwood Centre

November 9, 2020

The tongue is just part of the story:

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Can you spot the difference:

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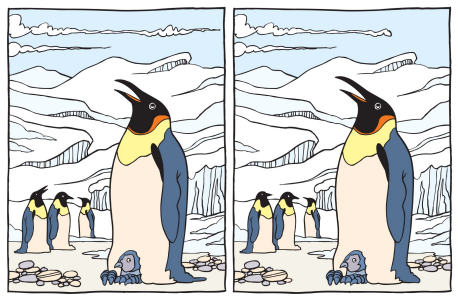

Turning sour lemon sweet

Pictures: iStock/ Penelope GraBhoff/ prettyzhizhi

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HAVE you ever been tempted to bite into a slice of lemon?

Lemons are a key ingredient in a lot of food and drinks, and lemon zest is added to many dishes.

In combination with other ingredients, lemon adds flavour.

Lemon juice is also brilliant at tenderising meat, and temporarily preventing fruits such as apples and bananas from turning brown.

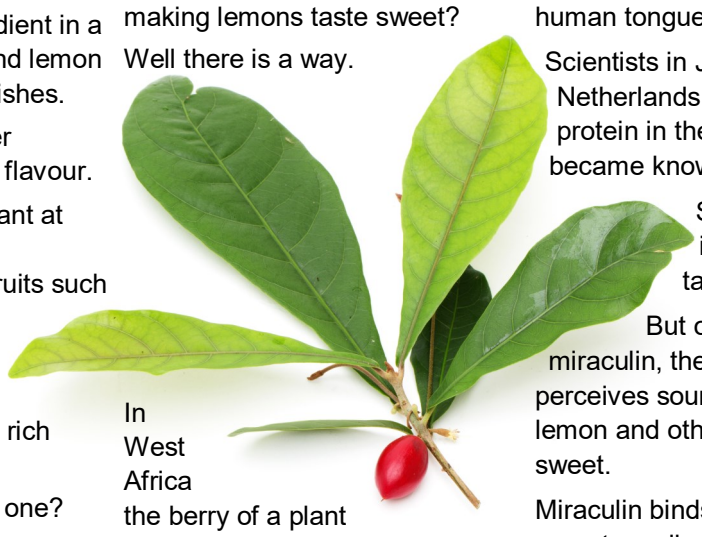
They are also good for you, because they are a rich source of vitamin C.

So why not just bite into one?

The answer is obvious - lemons are too sour.

This is because the juice of a lemon is about 5-6 per cent citric acid, and sourness is the taste that detects acidity. But what if I told you there was a way of making lemons taste sweet?

Well there is a way.



In West Africa the berry of a plant called *Synsepalum dulcificum* has been used to make sour foods taste sweet for hundreds of years.

Commonly known as miracle fruit, the berry contains a protein which plays tricks with the human tongue.

Scientists in Japan and The Netherlands isolated the protein in the 1960s, and it became known as miraculin.

Strangely miraculin itself does not taste sweet.

But once exposed to miraculin, the human tongue perceives sour foods, such as lemon and other citrus fruit, as sweet.

Miraculin binds to the sweet receptor cells on tastebuds and lasts for up to an hour.

The taste receptor cells located on the taste buds in our mouths, mainly on our tongues, are partly responsible for how we perceive flavour.

By the way, those bumps on your tongue are not your taste buds.

They are club-shaped `fungiform papillae', and each of them is home to taste buds.

Your tongue is also covered in other types of papillae.

There are five different types of tastes that receptors can detect - saltiness, sweetness, sourness, bitterness and unami (savouriness).

Our sense of taste is designed to help humans distinguish between safe and dangerous food, and to recognise a food's nutritional value.

For example, sweet foods signal the presence of carbohydrates, which provide energy, and that is perceived as a good thing.

But of course we know what can happen if you eat to much sweet food.

Sour can be pleasant in small quantities, but unpleasant in larger quantities.

Oranges are one per cent or less citric acid, and are therefore pleasant to eat, but lemons and other food with a higher amount of acid taste unpleasantly sour.

This is probably because sour can signal unripe fruit, or rotten food that can be dangerous to the body.

Bitter is also perceived as a flavour to stay clear of.

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"Education perhaps more than anything else is a passport to a better life." - Peter Underwood AC

The taste test is a bittersweet experience

From Page 1

Interestingly toxic substances such as strychnine and cyanide taste bitter.

The remarkable qualities of the little red berry of the *Synsepalum dulcificum* plant was first recorded in 1725 by French explorer Reynaud Des Marchais in West Africa.

He noted that the locals would eat the fruit before consuming bland, sour breads.

There are two other plant species used to alter the perceived sweetness of foods - *Gymnema Sylvestre* and *Thaumatocossus daniellii.*

Gymnema Sylvestre is a woody vine native to several parts of the world, including Australia, where is it is known as Australian cowplant.

Its leaves have been used in herbal medicine for a long time.

Thaumatocossus daniellii is native to Africa, but is an introduced species in Australia.

Just as they do with the berries of *Synsepalum dulcificum,* West Africans chew the seeds of *Thaumatocossus daniellii* before eating sour foods.

Here's an experiment for you to try at home to see if you can identify the five basic tastes—salty, sweet, sour, bitter and unami in a variety of foods.

Ask an adult family member for permission first.

On a piece of paper, draw six columns.

The first column is to list various food items you have in your kitchen.

Examples might include sugar, lemon, cheese, fruit, chocolate, various types of sauce and coffee.

Anything really.

The other five columns are for the types of taste.

Then sample very small amounts of the food items (you don't want to make yourself ill), and tick the columns of the tastes you pick up.

No doubt, sugar will taste sweet, and vinegar will be sour, but some food items might have a combination of tastes.

Children's University Tasmania members can earn stamps in their passports for this challenge at the discretion of their school coordinators.

Hey bud, the nose has a role

OUR tongues are mainly, but not entirely, responsible for how we perceive taste.

Other taste buds are found in our throats and on the roof of our mouths.

We have between 5,000 and 10,000 taste buds, and each taste bud consists of 50 to 100 taste receptor cells.

When these cells are stimulated by the chemicals in food, signals are sent from nerve endings to a specific area of our brain where taste is perceived.

But our noses also play a vital role.

Have you noticed how food does not taste the same when you have a bad head cold?

Food odours are detected by sensory cells in our noses, and also send a message to the brain, so it is in fact the combination of smell and taste which creates the perception of flavour.

But there are other things besides taste happening in our mouths.

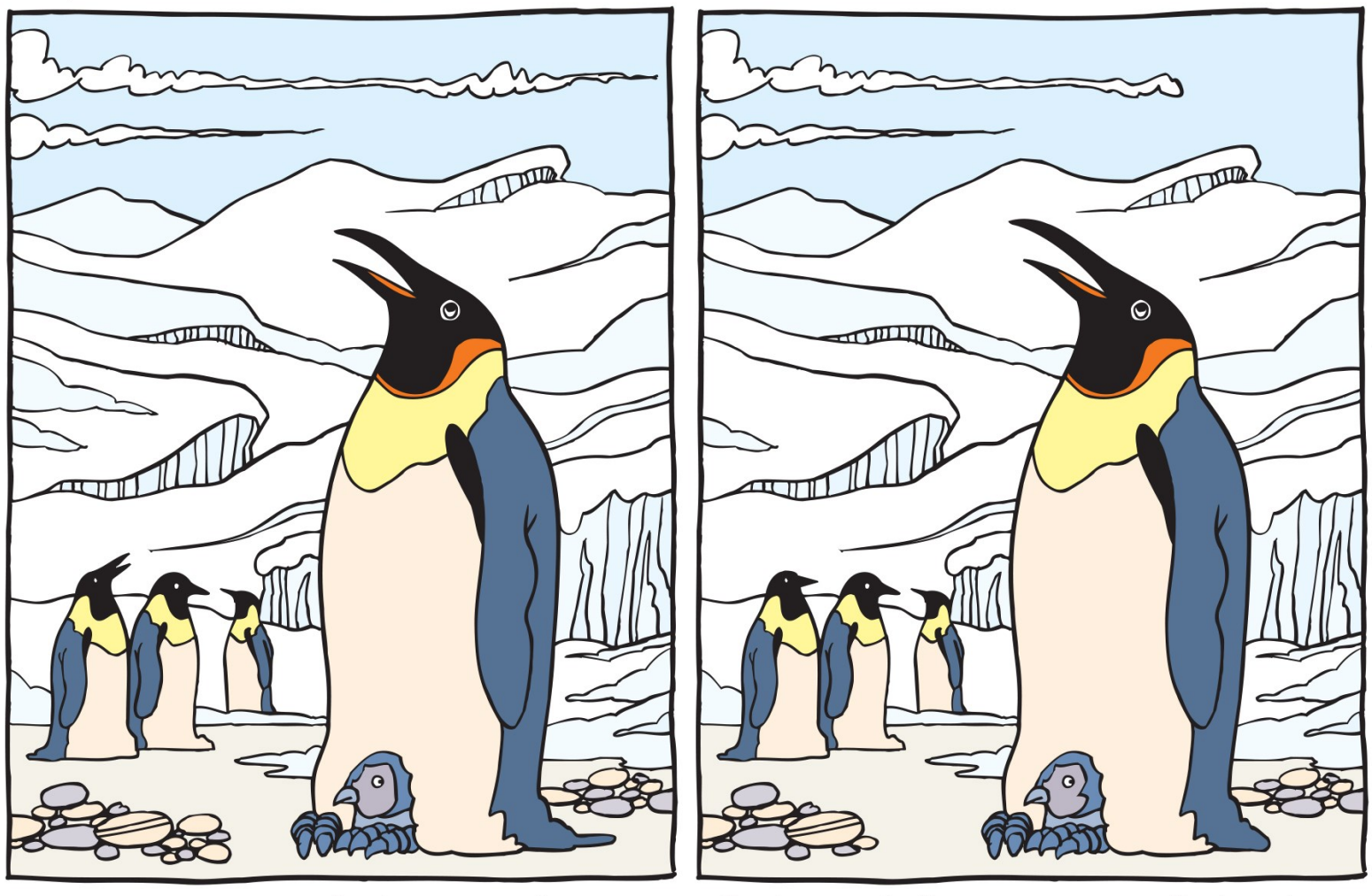
For example, there are receptors that are activated when we eat hot food, or food containing capsaicin, such as chillies, and receptors responsible for the `cold' feeling we have when we eat menthol or mint.

When you do the taste challenge, try pinching your nose?

Pictures: iStock/ MichaelJay

SPOT THE DIFFERENCE

There are eight small differences between the first giant king penguin picture and the second one. See if you can spot them. The solution is below.



SOLUTION: 1. Cloud changed, 2. Ice at left changed, 3. Rocks at front missing, 4. Front penguin's beak longer, 5. Shape of penguin chick's face changed, 6. Front penguin's tail shorter, 7. Left hand penguin's beak closed.

Artwork: www.johnpollyfarmer.com.au/