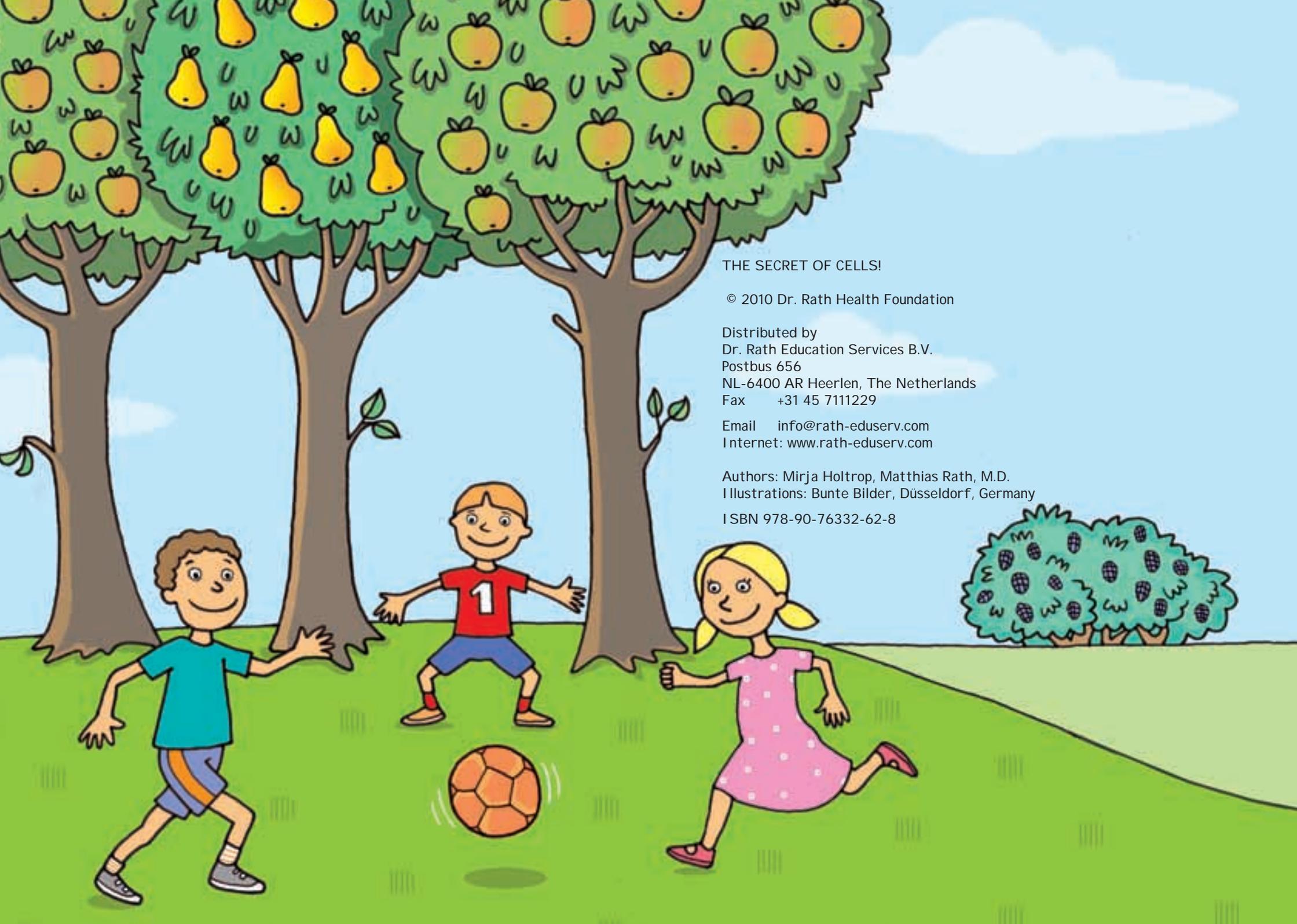


# The Secret of Cells!





THE SECRET OF CELLS!

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This book explains the body of:



# This is me

Hello, I'm Julien. I'm nine years old and I live in a small town in England. Fortunately, there's very little traffic on our street, so we can play outside as often as we want.



This is my mum and dad. They're putting the rubbish out just now. We separate our refuse; it's better for the environment.



Here you can see my grandma, Gertie. She's sitting on the bench in front of our house with our parrot, Charlie. Charlie is already 34 years old and he can talk. Sometimes he shrieks "Look out—police!", then people are so shocked and we laugh so much that it hurts!

That is our dog Tapsy. He wants to play with Molly, our neighbour's cat.

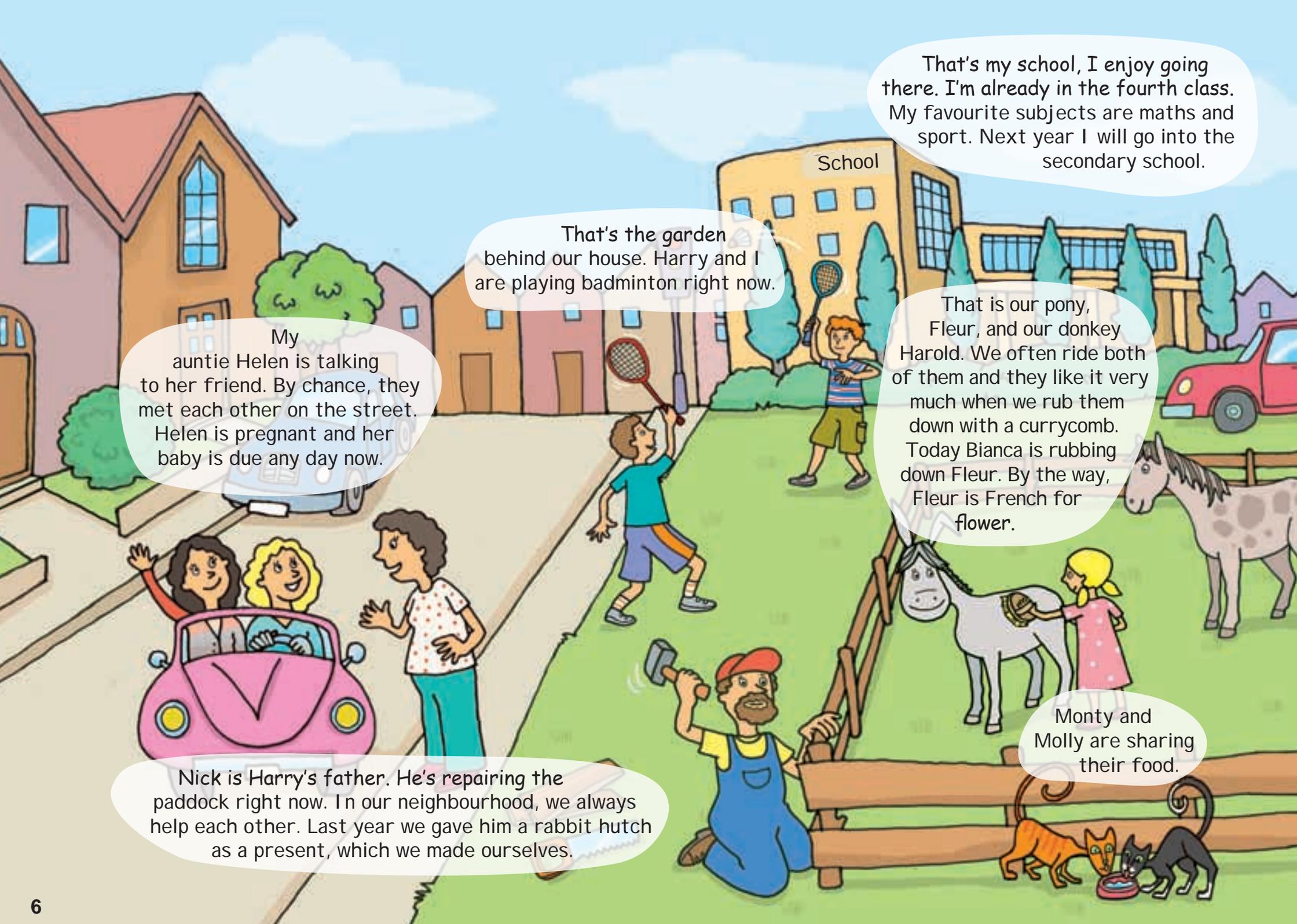
My best friend Harry has got a new remote controlled four-wheel drive. Cool!

My sister Karla and her friend Bianca are playing skipping.

Here you can see my cousin Emily and her friends Charlotte and Sophie playing with their dolls.

That is Molly's friend, Monty. He is very nice and we often stroke him.

Molly doesn't want to play. Dogs are sometimes a little too demanding, so then she runs away.



That's my school, I enjoy going there. I'm already in the fourth class. My favourite subjects are maths and sport. Next year I will go into the secondary school.

That's the garden behind our house. Harry and I are playing badminton right now.

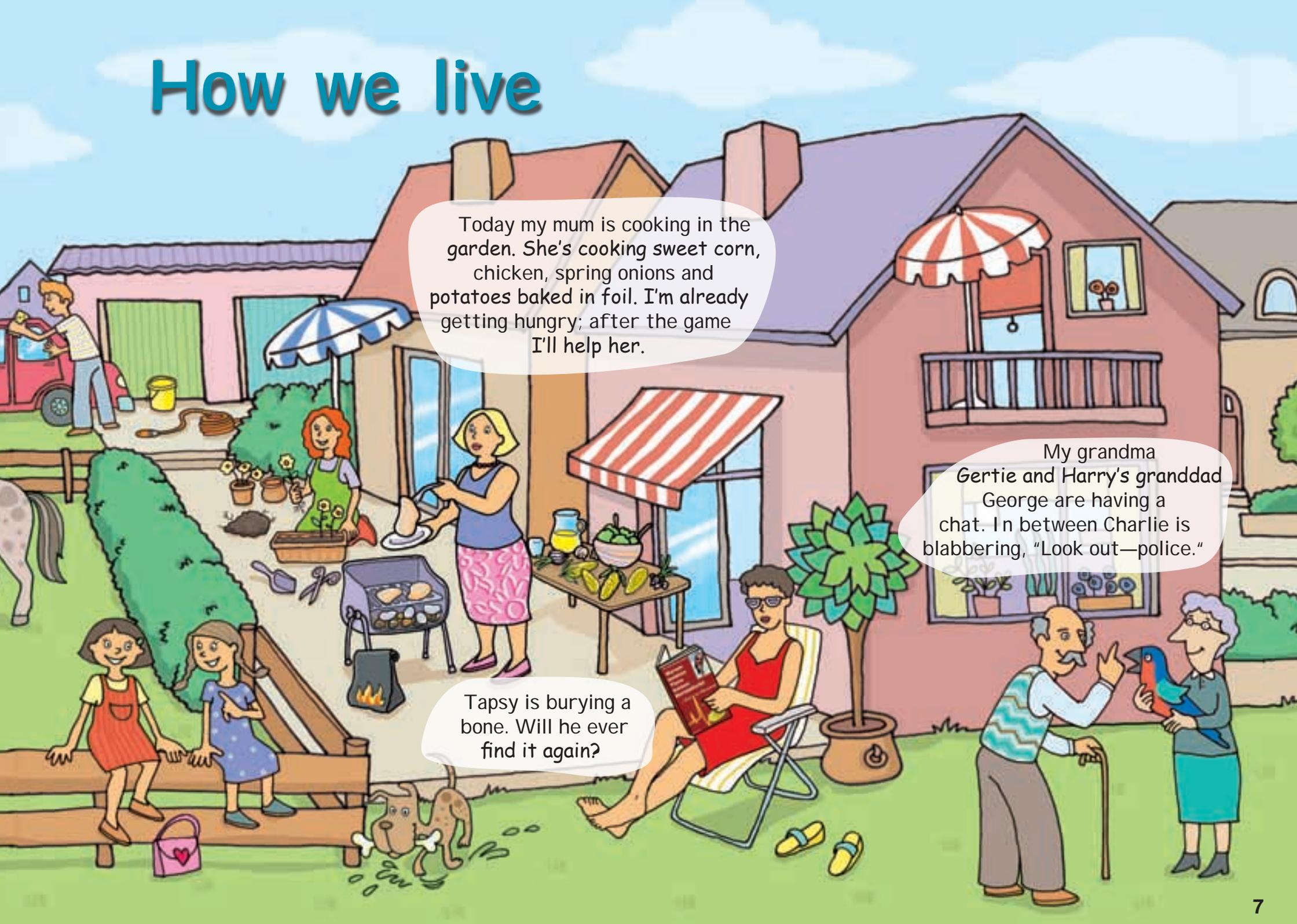
My auntie Helen is talking to her friend. By chance, they met each other on the street. Helen is pregnant and her baby is due any day now.

That is our pony, Fleur, and our donkey Harold. We often ride both of them and they like it very much when we rub them down with a currycomb. Today Bianca is rubbing down Fleur. By the way, Fleur is French for flower.

Nick is Harry's father. He's repairing the paddock right now. In our neighbourhood, we always help each other. Last year we gave him a rabbit hutch as a present, which we made ourselves.

Monty and Molly are sharing their food.

# How we live

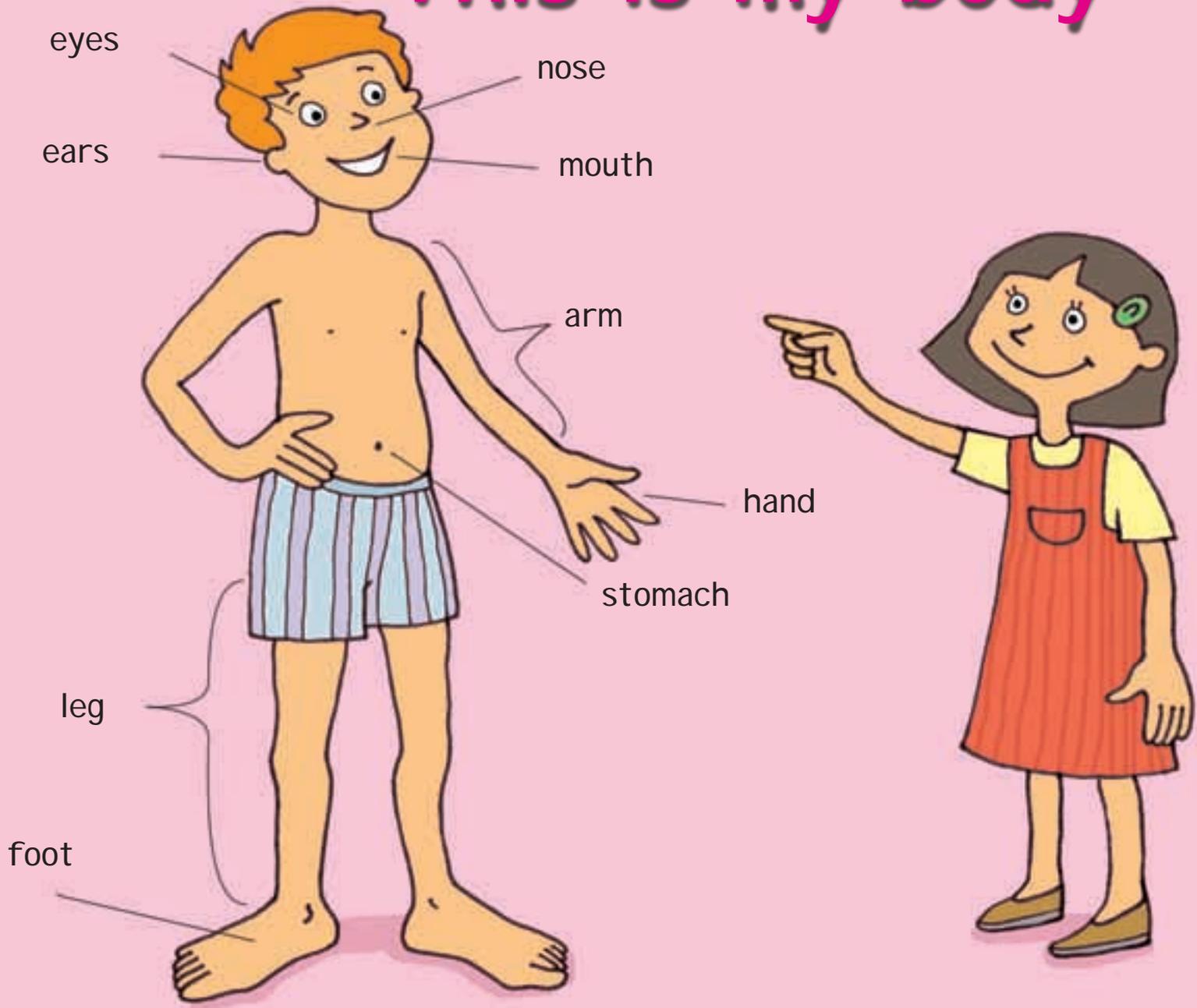


Today my mum is cooking in the garden. She's cooking sweet corn, chicken, spring onions and potatoes baked in foil. I'm already getting hungry; after the game I'll help her.

My grandma Gertie and Harry's granddad George are having a chat. In between Charlie is blabbering, "Look out—police."

Tapsy is burying a bone. Will he ever find it again?

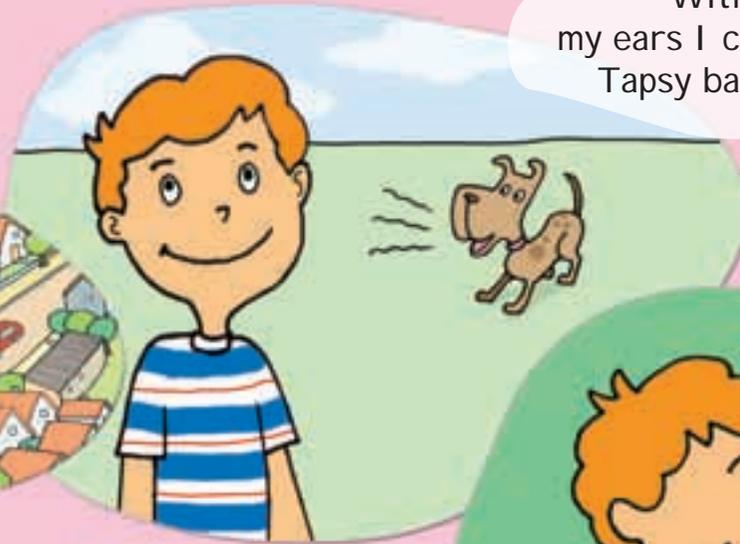
# This is my body



With my eyes I can see the town.



With my ears I can hear Tapsy barking.



Mmmm, with my nose I can smell the warm milk!



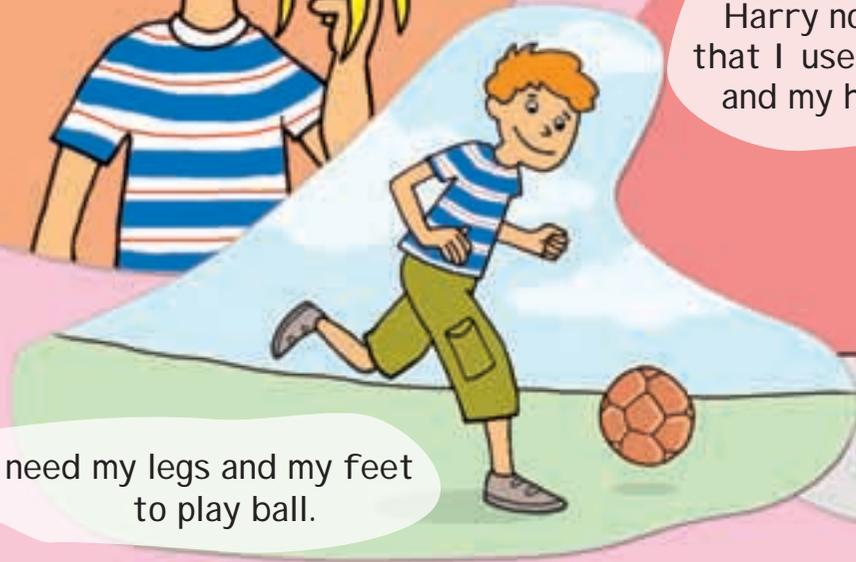
With my mouth I can eat the banana.



I'm painting a picture for Harry now. For that I use my arm and my hand.

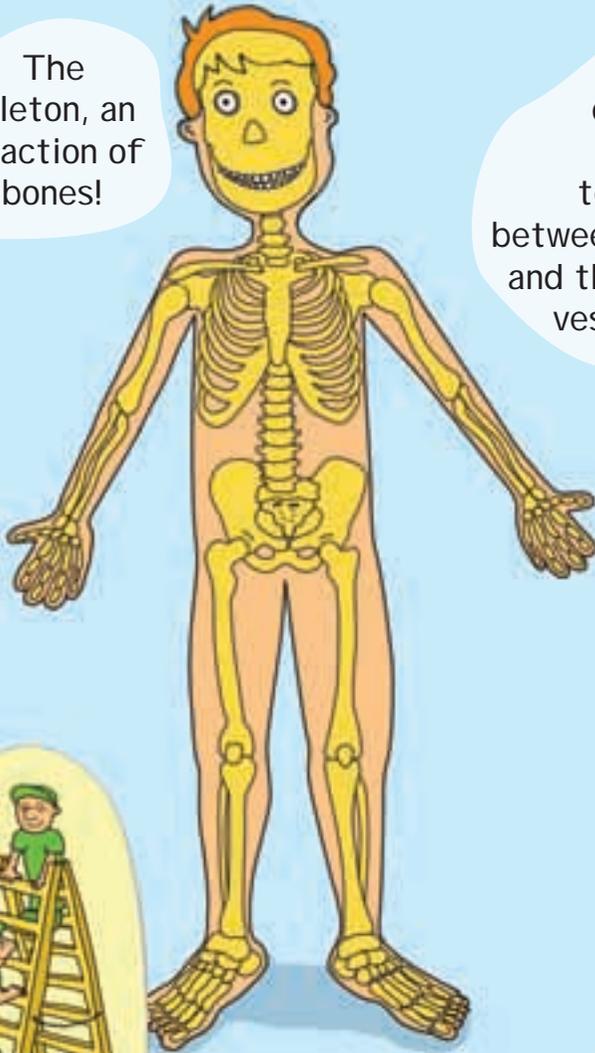


I need my legs and my feet to play ball.

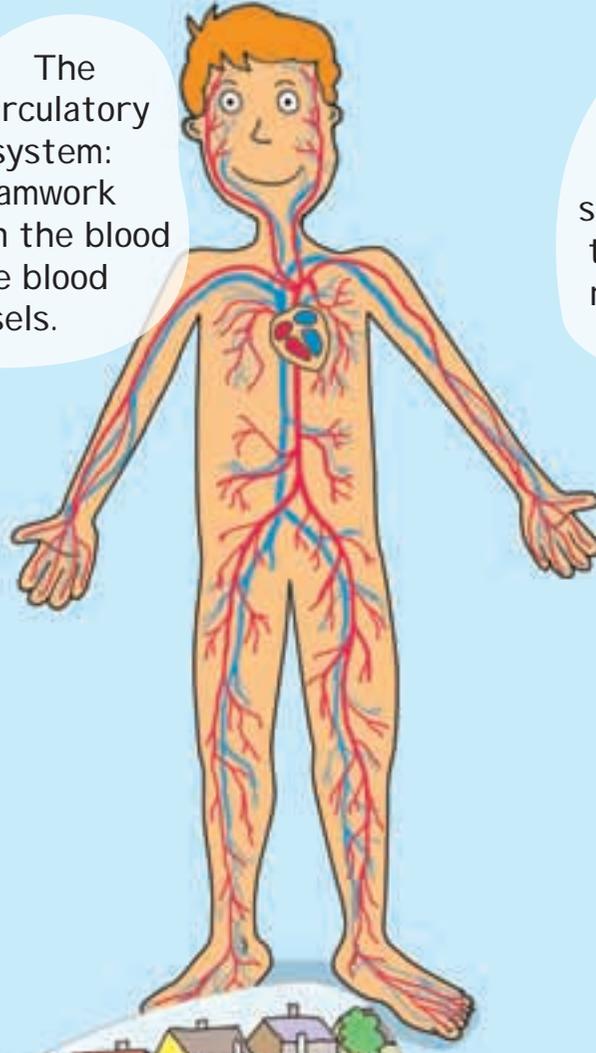


# A view of the inside of my body

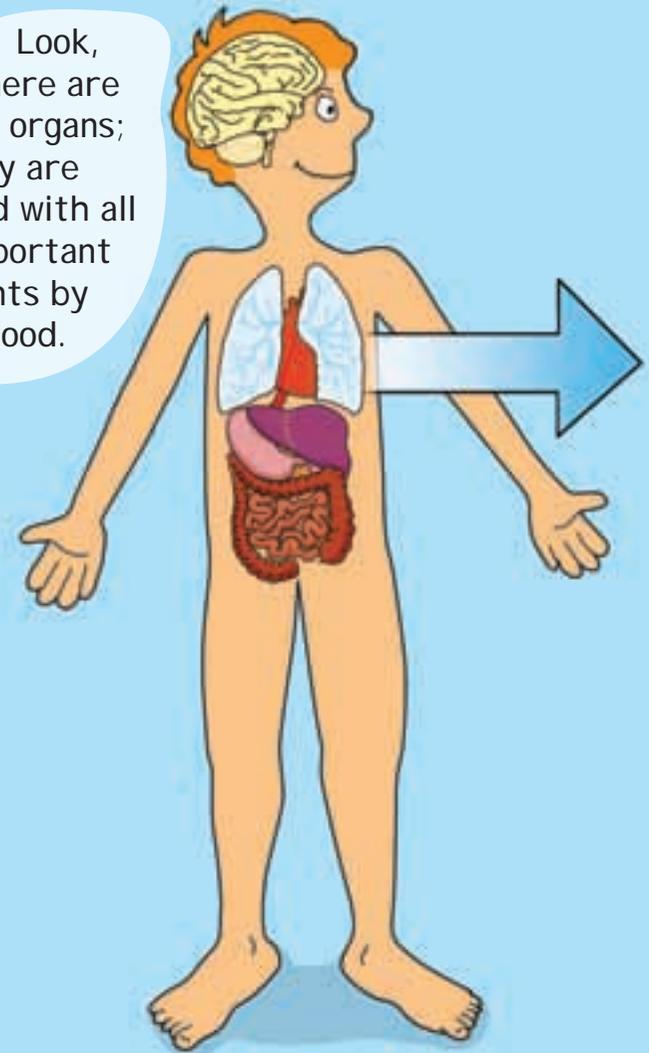
The skeleton, an interaction of the bones!



The circulatory system: teamwork between the blood and the blood vessels.



Look, there are some organs; they are supplied with all the important nutrients by the blood.

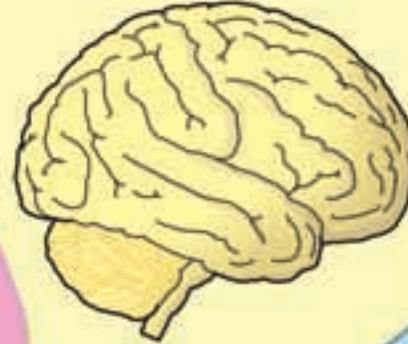


Our skeleton gives us stability.

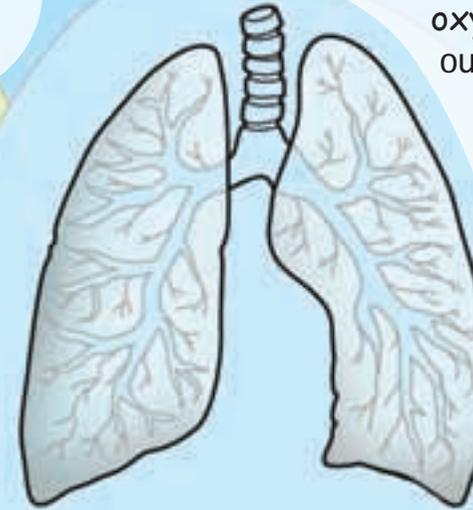


Even the smallest parts of our body have blood vessels going through them. Blood vessels are transport routes for the blood cells. Just as cars drive along our streets, in a similar way, blood is running through our body.

**The brain** is like a computer. It stores memories and controls feelings like hunger and thirst or fear and happiness.



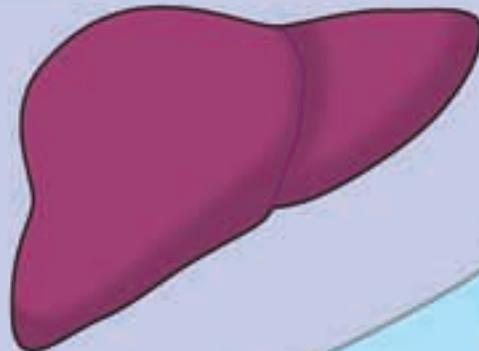
**The lungs** are like a big air conditioning system. The oxygen is filtered out of the inhaled air and passed on to the blood vessels.



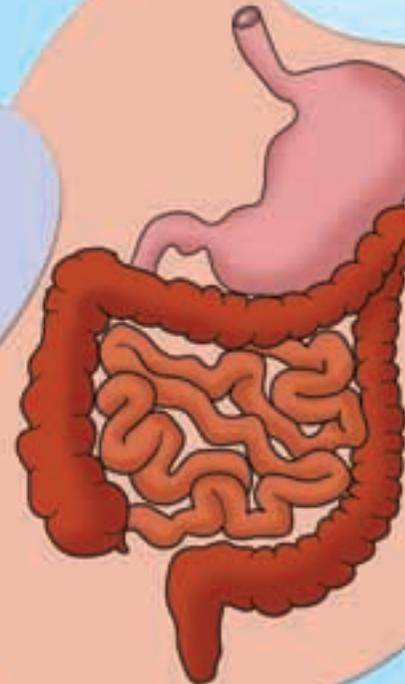
**The heart** is like a pump, it pumps blood through the whole body.



**The liver** is like a big laundry. The blood flows through it and is cleaned.



**The gastrointestinal tract** is a machine to break down food and distribute nutrients. When I eat, the food goes into my stomach. Here it is broken down into tiny little pieces. Later, in the intestines, all the precious elements are taken out of the nutrient porridge and transported to the organs by the blood.



# Our body consists of cells, and cells are like houses...

Now we know our body and understand about organs, but what are the organs made of? The answer is simple: our whole body is made up of cells. But where are the cells and what do they do? They are closely connected with my life, but you can see for yourself:



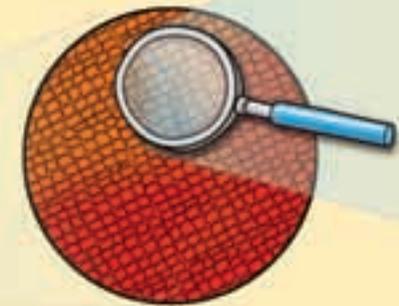
Look here, this is the globe of the world and this is my body.



Just as Europe is a part of the world, an organ, in this case the heart, is a part of my body.



If we look on a larger scale, we can see a community. Hey, that's our neighbourhood! If we look at one of my organs, we can see a community of cells. They are like small houses packed closely together, which are nourished by the blood system. They are the foundation of all life.



Here you can see our house and, in the next picture, you can see into the kitchen.

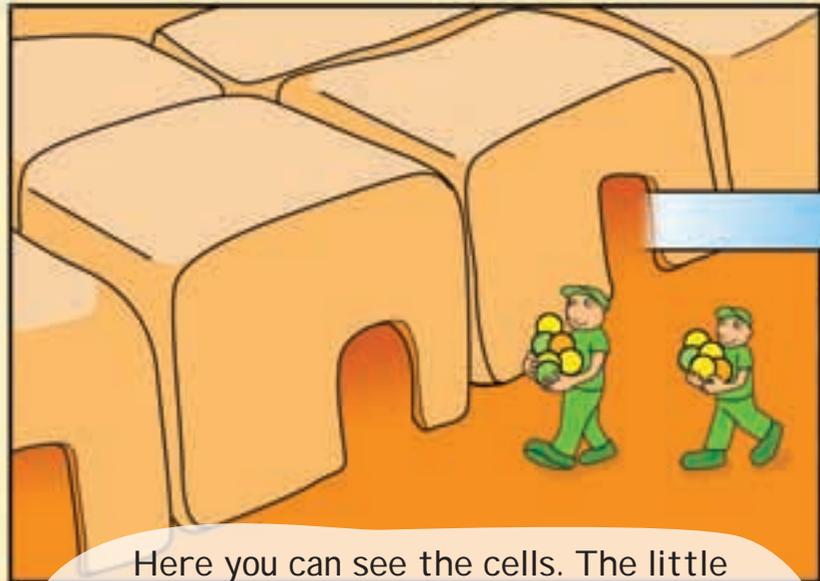


Mom is cooking, Karla is taking the rubbish out and dad is fixing the door.



Can you see? The life of the cells is closely connected to our daily life: Cells need to get energy, dispose of refuse and also need to be repaired. The cells have their little helpers to do what the family does in their daily life.

Here you can see the cells. The little men are the cell helpers. In the next picture you can observe how the helpers take care of the cells.

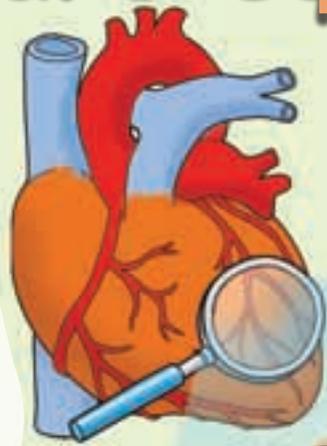


They prepare nutrition, they keep the cells clean and repair damaged parts.



# All cells are equal

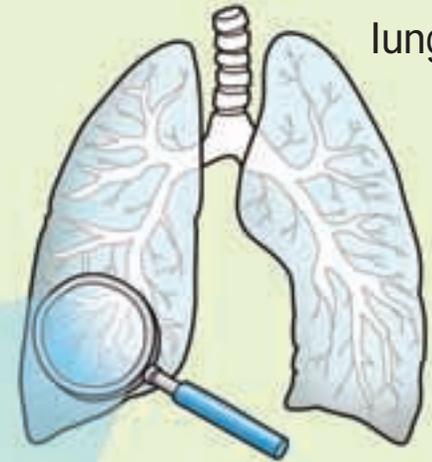
It makes no difference which organ you look at, all organs consist of cells. And all cells function in the same way. All cells are nourished by the blood system.



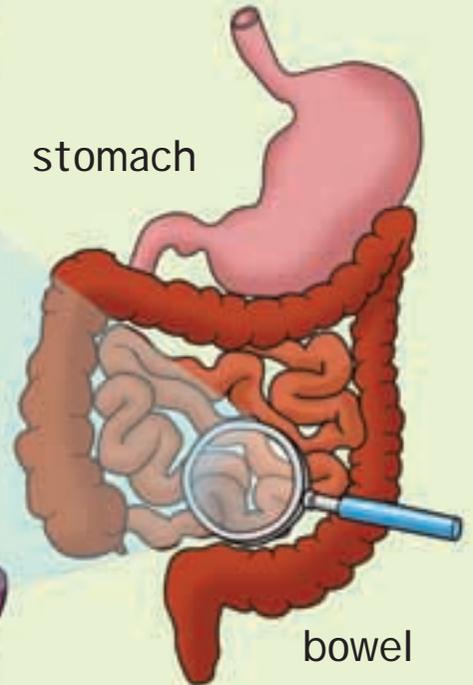
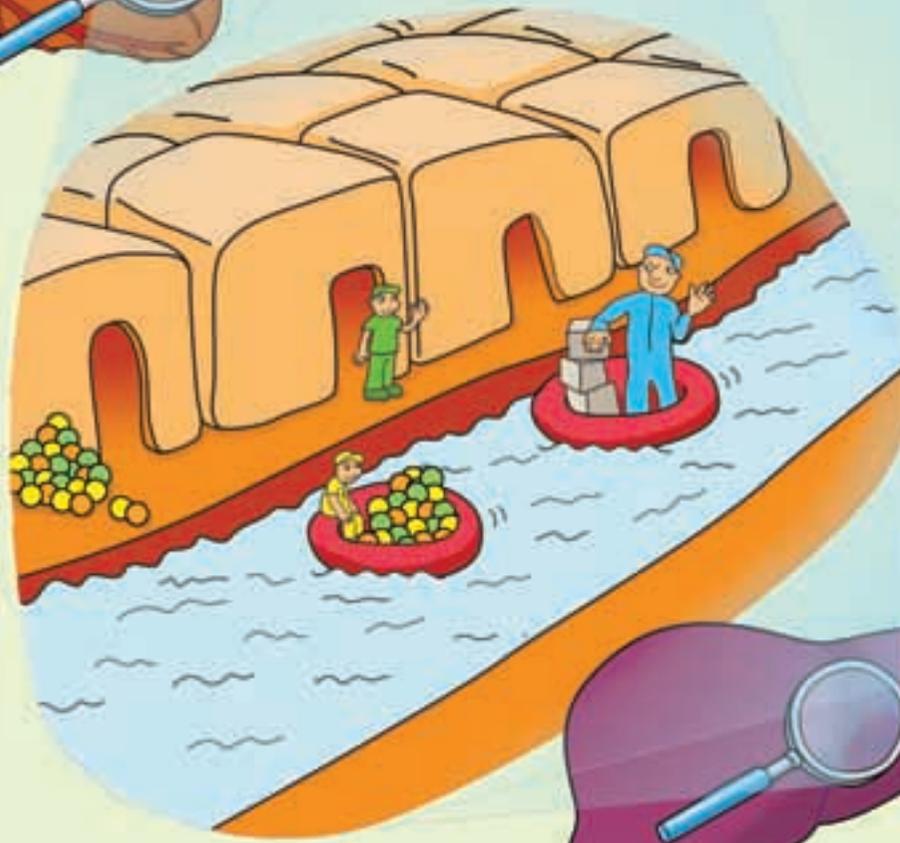
heart



brain

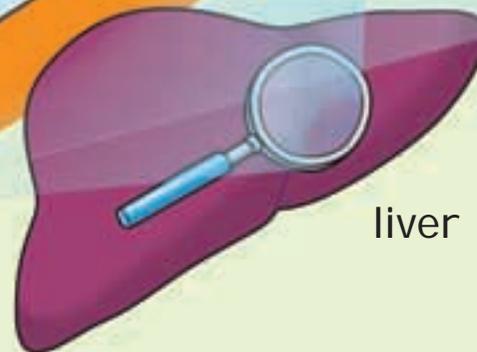


lungs



stomach

bowel



liver



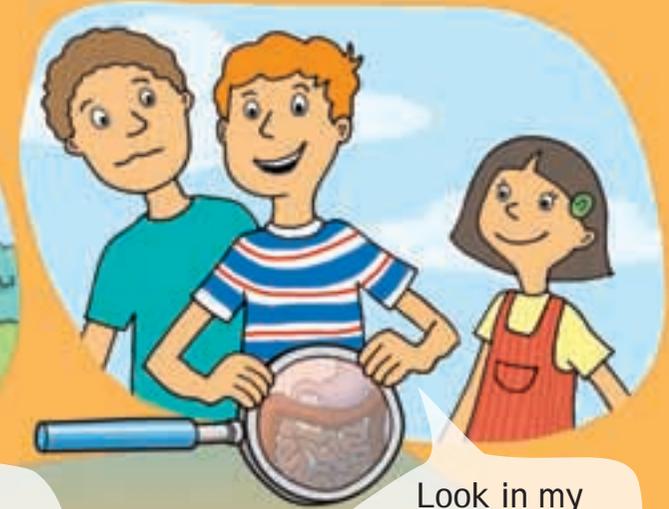
# I'm hungry!



We just played football. It was great fun.



At half-time I had a rumble in my stomach - I was really hungry.



Look in my stomach, that's also what it looks like inside your stomach when you're hungry.

When you are hungry, we rumble and cry out for food. The brain hears that and sends out a signal: the hungry feeling. The vitamin-helpers are actually so small that the brain doesn't hear them.

**Rumble**

We're hungry!

Send the food down!

**Food!!**

Let's shout together, we need something to eat!

We can't!  
We're too small;  
no-one can hear us.

Are the vitamins here for us?

At the moment there's nothing there!

Here, eat these biscuits.

Thanks!

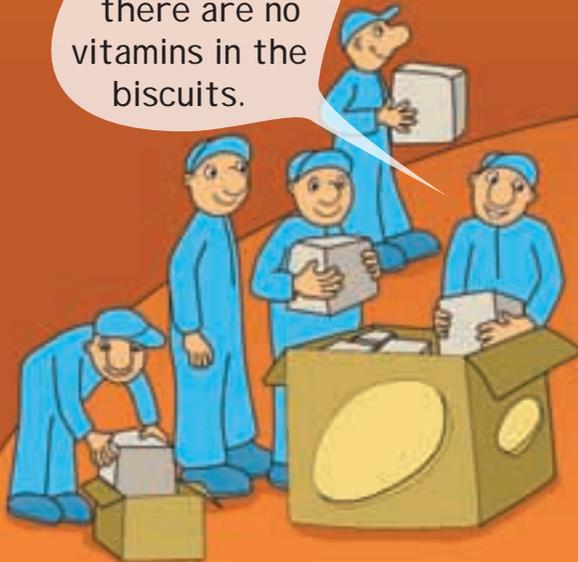


Look what's happening in my belly now:  
Because of the biscuits, the nutrient  
delivery men are very busy.

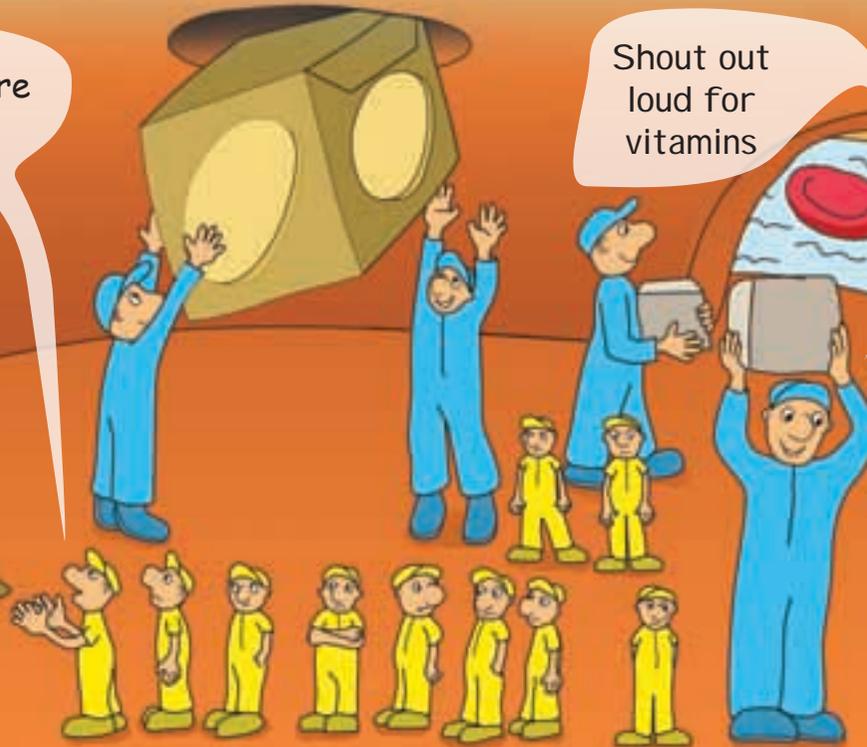


Are there any vitamins  
there? The cell-helpers are  
already waiting.

Sorry—no,  
there are no  
vitamins in the  
biscuits.



Shout out  
loud for  
vitamins



See! You never feel hungry for  
vitamins. You have to make sure  
your vitamin delivery boys are  
always busy.

We can't.  
We're too small  
to do that.



# The secret of the banana



And now let's look inside my belly.

After the football game I always have a banana. Mum always says that bananas are healthy. Mmm, tasty!

Here little delivery boys, take the vitamins! Go to the cells!

Suuuper!

Yippee!

Now we're happy!



We're already waiting for you!

arm  
foot  
brain  
eyes

Look at these little delivery boys: They're racing off to their dinghy and are full of joy as they travel along.

heart

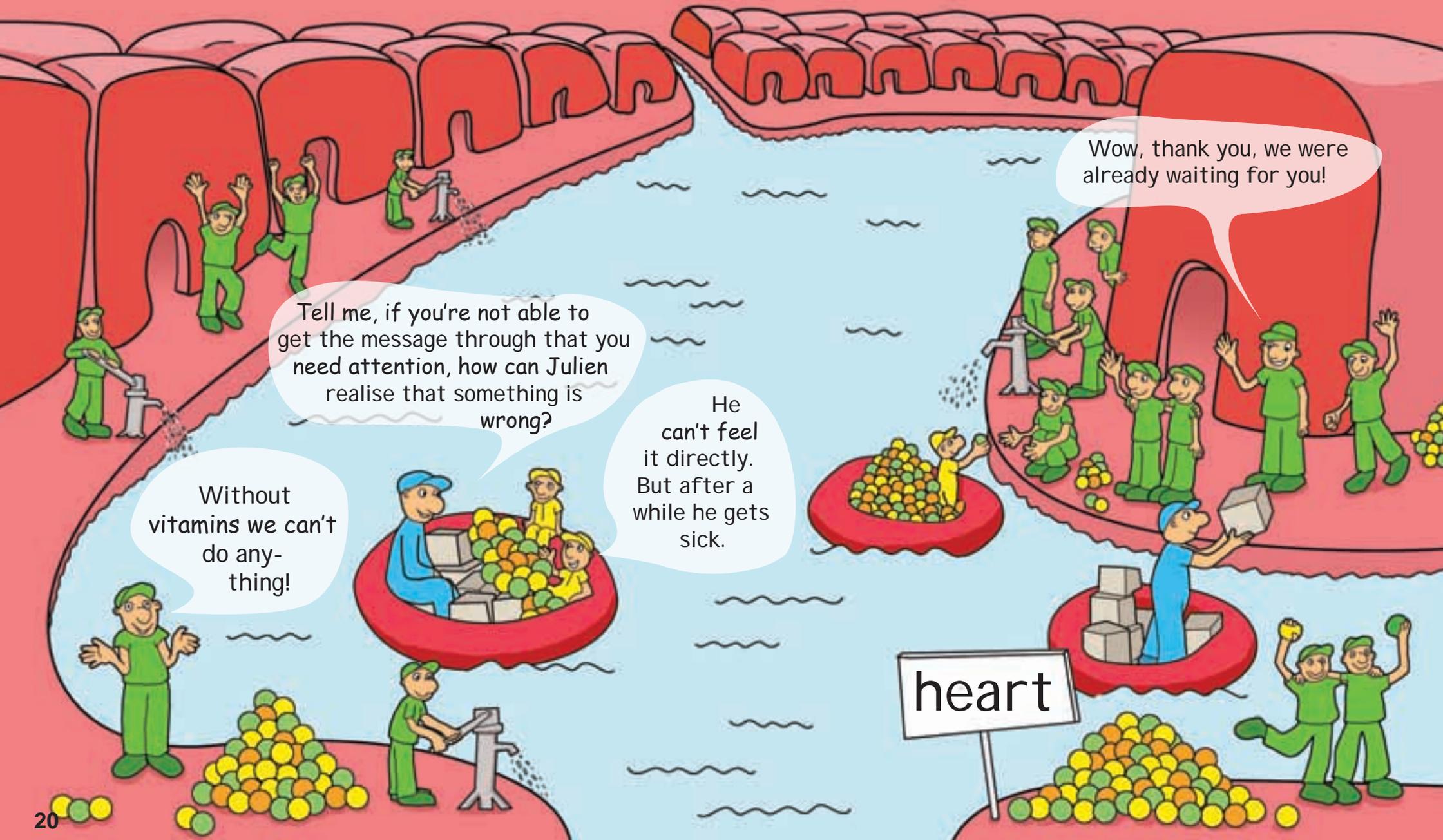
liver

lungs

Finally we can deliver again.

Yahoo!

# The way that the nutrition and vitamins travel



Tell me, if you're not able to get the message through that you need attention, how can Julien realise that something is wrong?

Without vitamins we can't do anything!

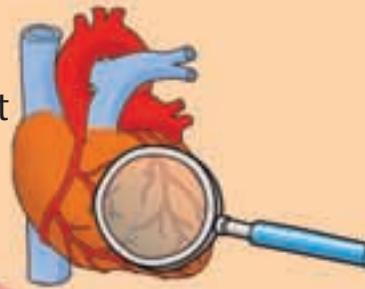
He can't feel it directly. But after a while he gets sick.

Wow, thank you, we were already waiting for you!

heart

# to the cells

heart



Now you can see how happy the vitamin-delivery boys are when they get some banana! As a rule, every cell in our body has a job that is connected with the function of a particular organ. The heart cells are responsible for the pumping of the blood.



Yeah! Now I am strong again! Now I can repair the roof!



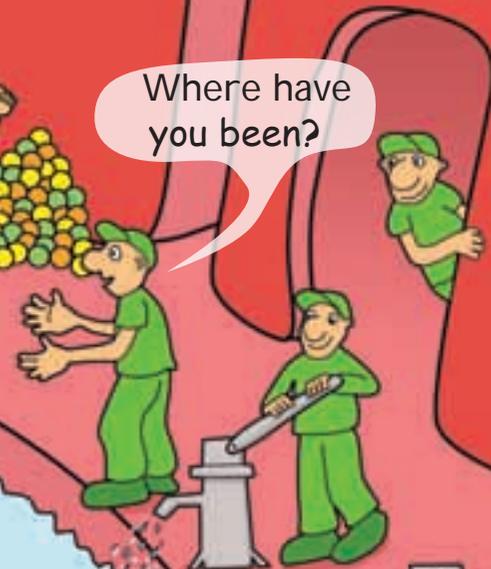
Oh, thanks. Now I can cook again!



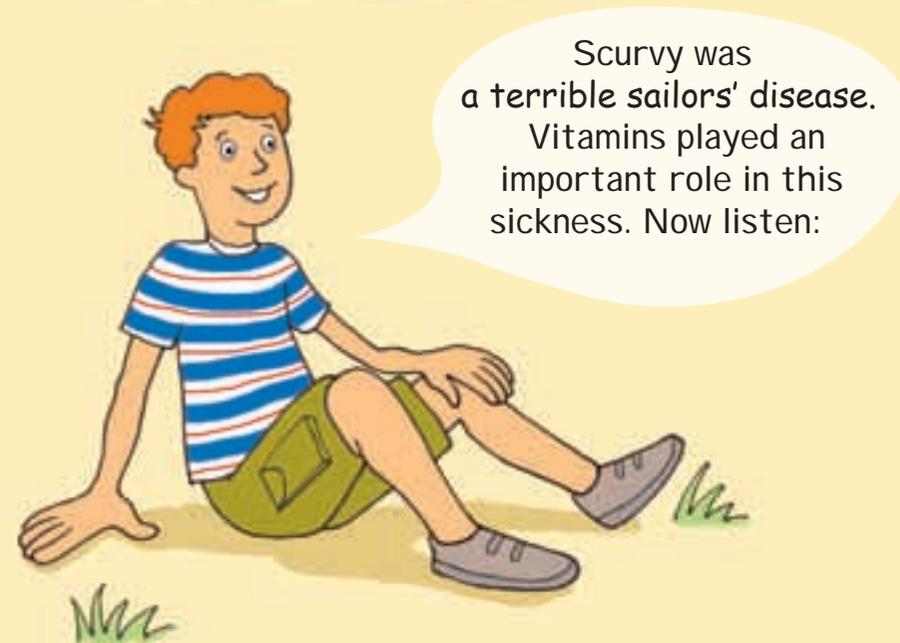
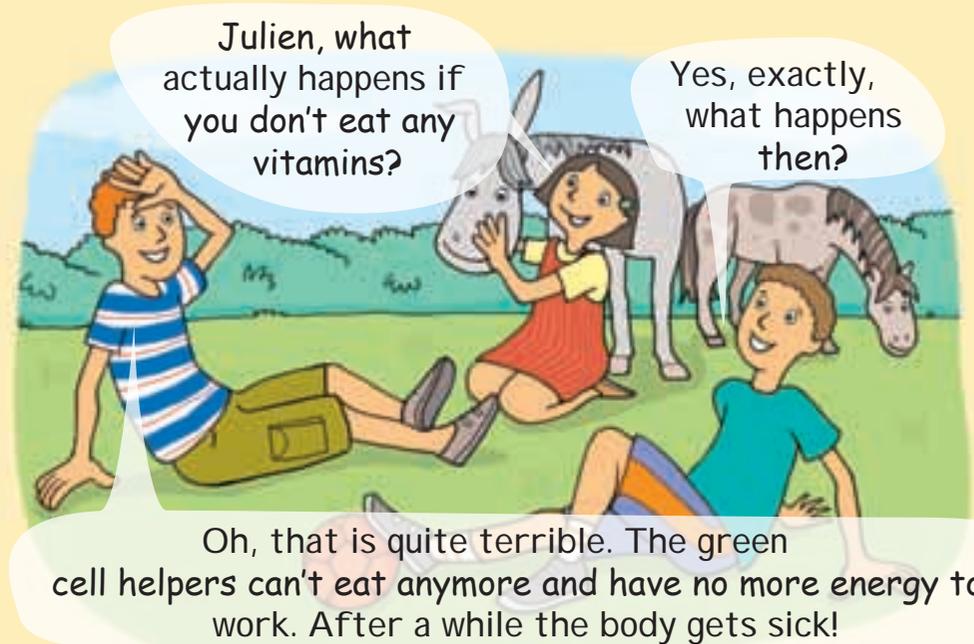
There was only the biscuits. We had to wait for the healthy bananas.

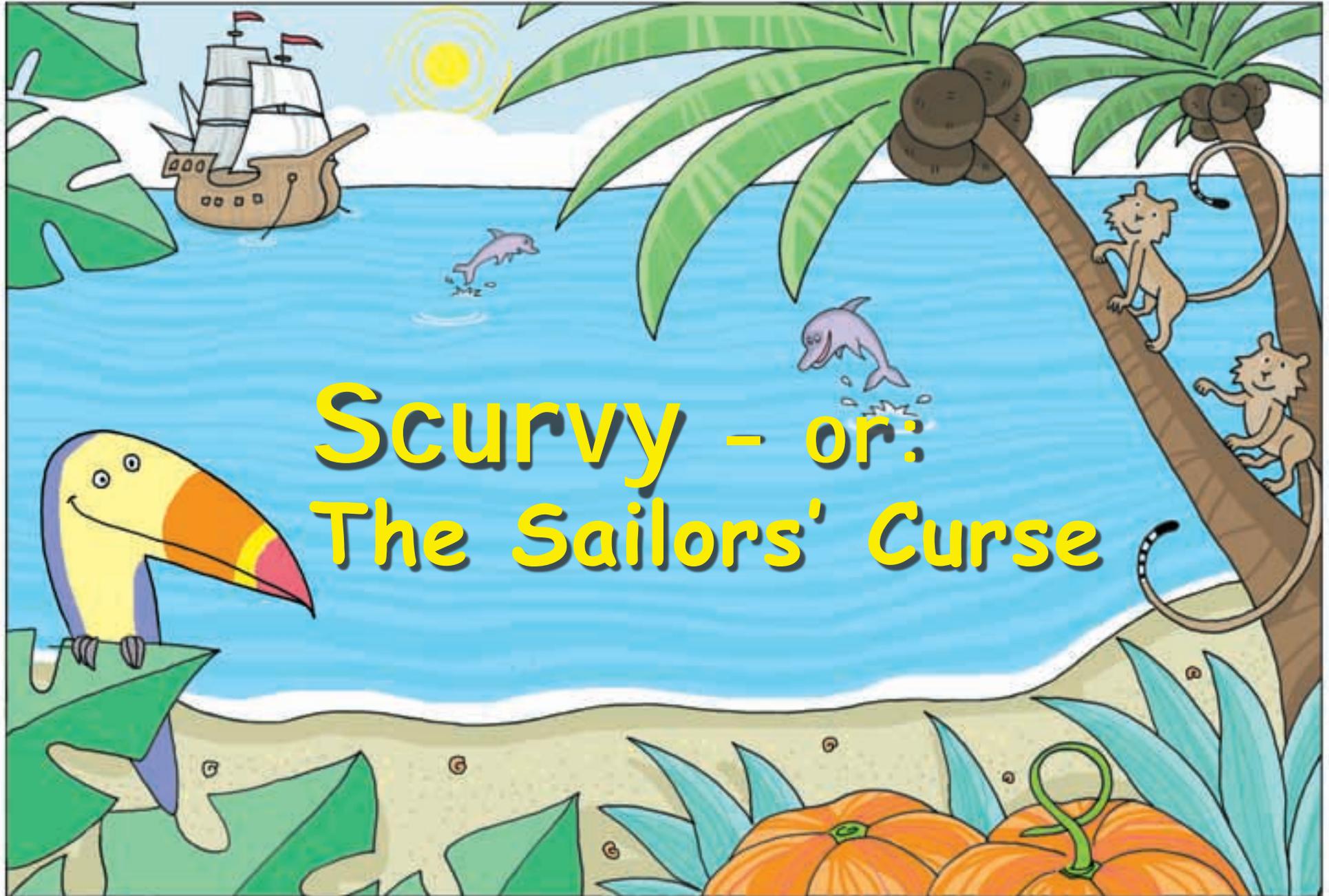


Where have you been?

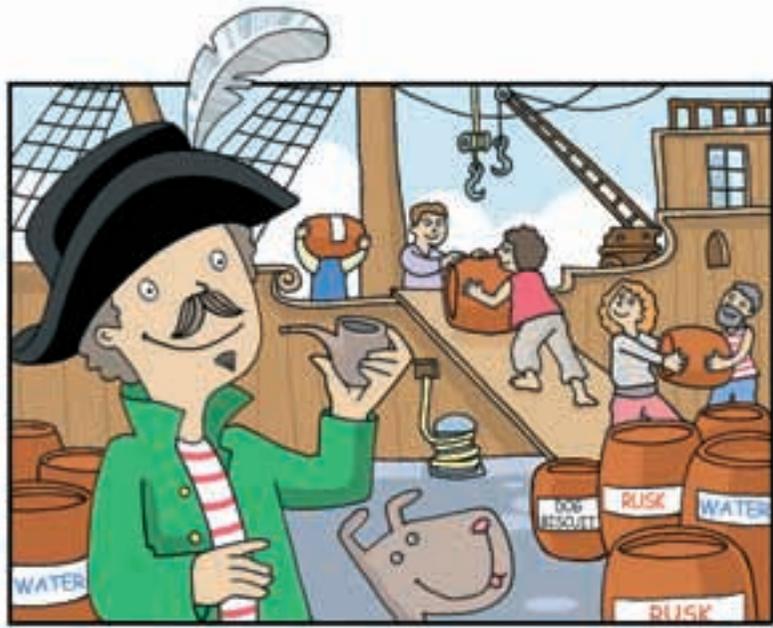


# Vitamins are essential for life!





# Scurvy - or: The Sailors' Curse



We find ourselves in Spain. It is the year 1661. Captain Sánchez and his crew are preparing for a great sea voyage. They want to discover unknown seas. They load the ship with huge quantities of water and sea biscuits—and food for the ship's dog. Then they set off.



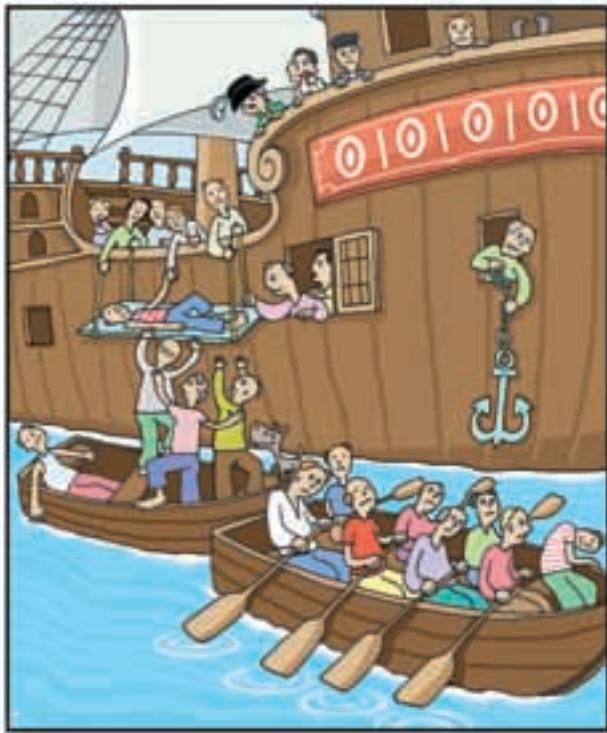


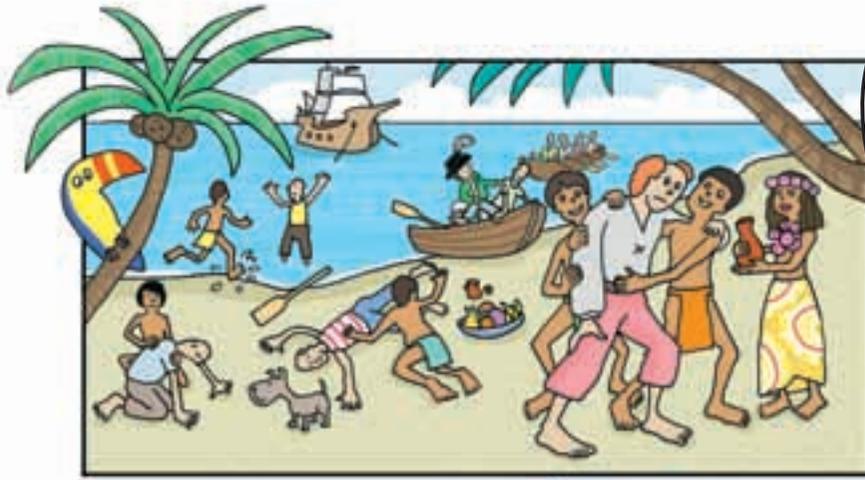
The same ship, the same crew, 10 weeks later: the sailor's have been struck down by an unusual sickness. They are bleeding; their teeth and hair are falling out. No one knows why. They have plenty of water and sea biscuits. Nobody is hungry. But the sickness gets worse day by day and they become weaker and weaker. Captain Sánchez tries to help his crew but he himself has no energy left. The only one that is healthy is the ship's dog. They are at a loss for a solution.



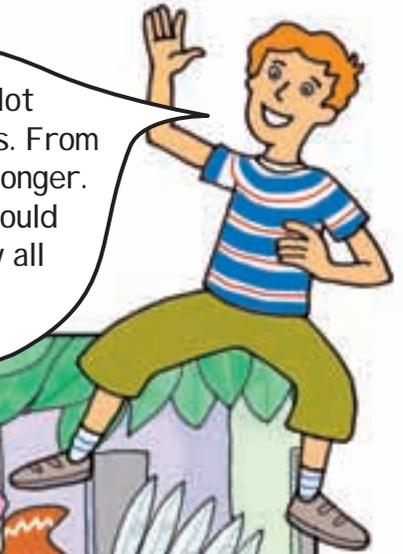
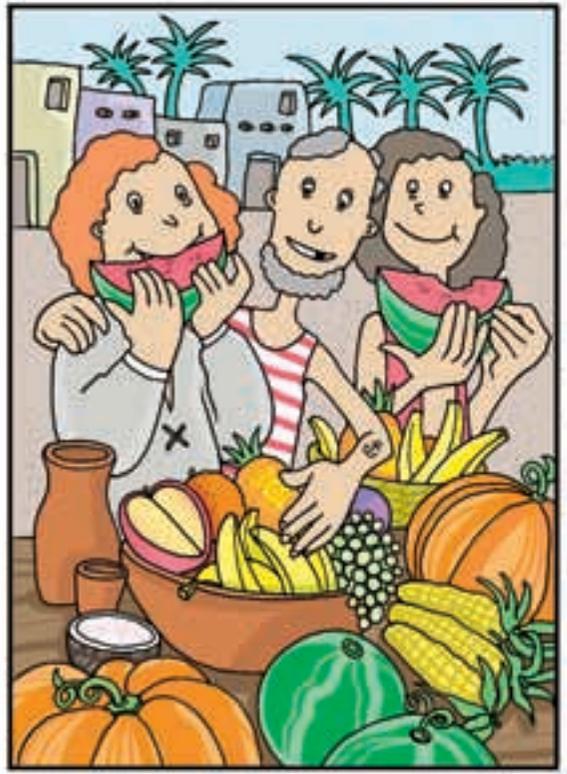


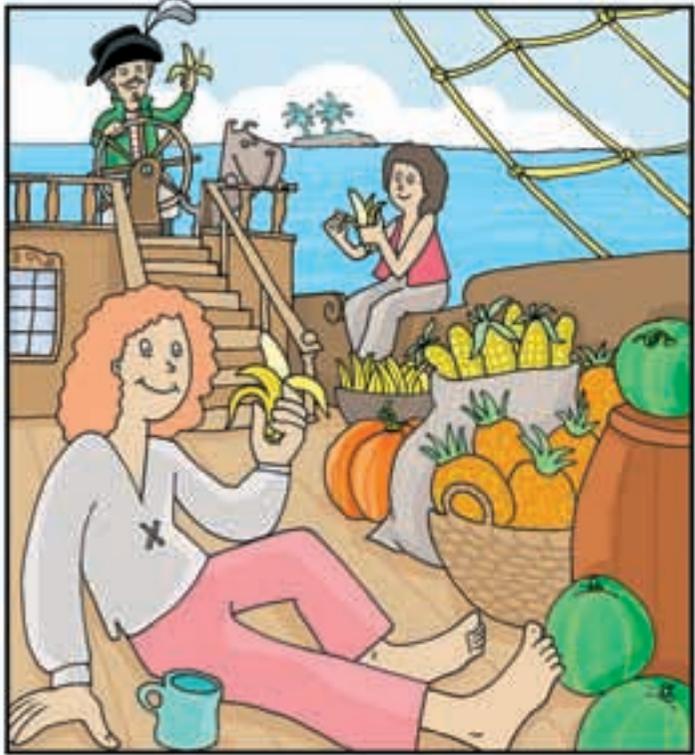
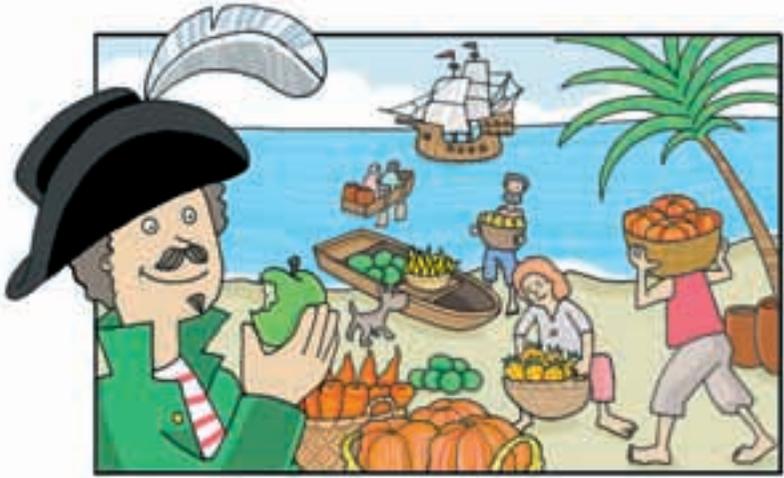
Then finally, Captain Sánchez sees an island on the horizon. They drop anchor. With their last energy they climb into the boats and row to the land. Some very friendly natives live on the island and they quickly take care of the sailors.



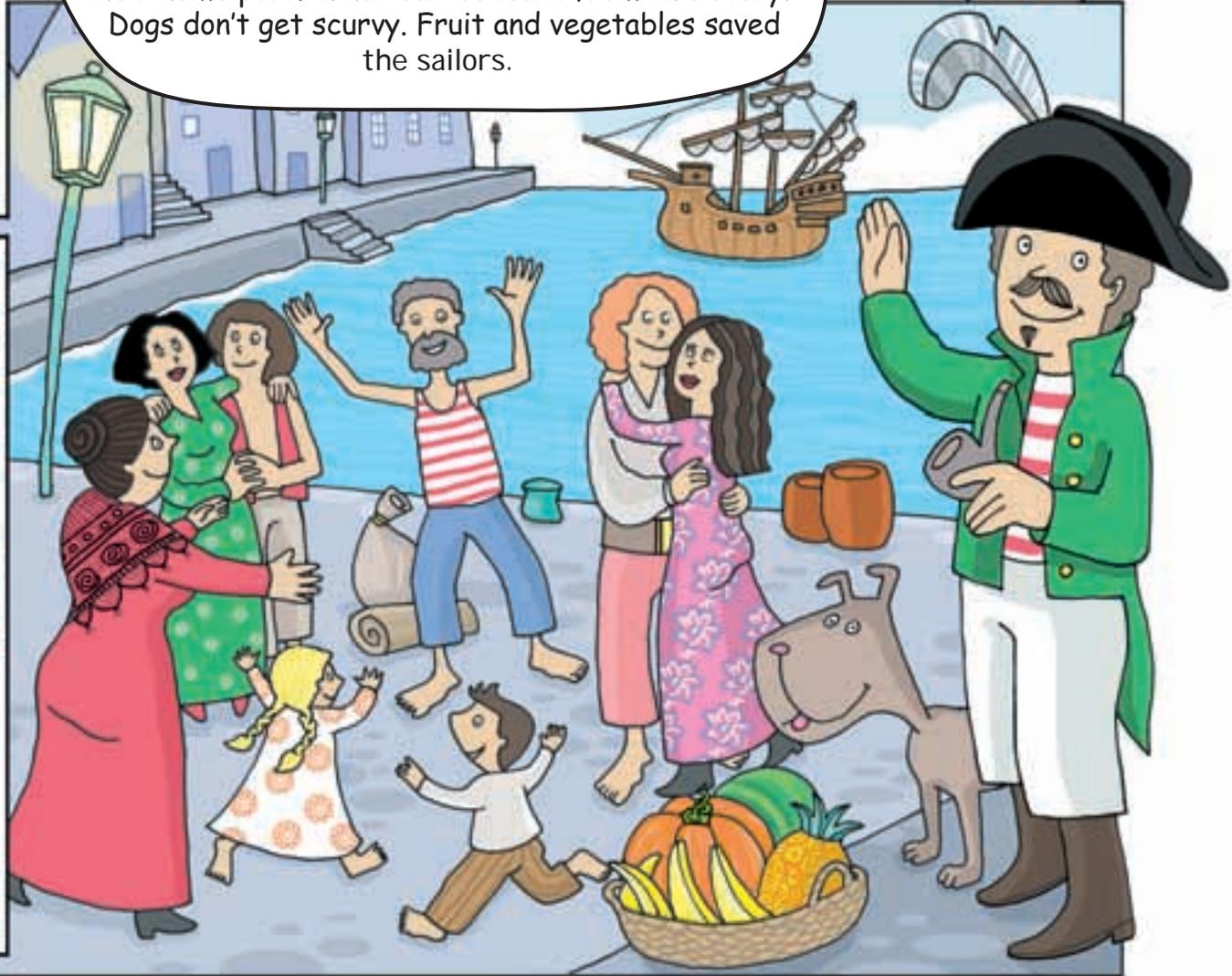


The natives help the sick and tend to their wounds. In the following weeks they give the sailors a lot of fresh fruit and vegetables to eat. The crew recovers. From day to day their sickness gets less and they become stronger. The chief of the natives is so happy that the sailors could be saved that he invites them to a great feast. They all celebrate and enjoy themselves. They dance excitedly around the campfire.





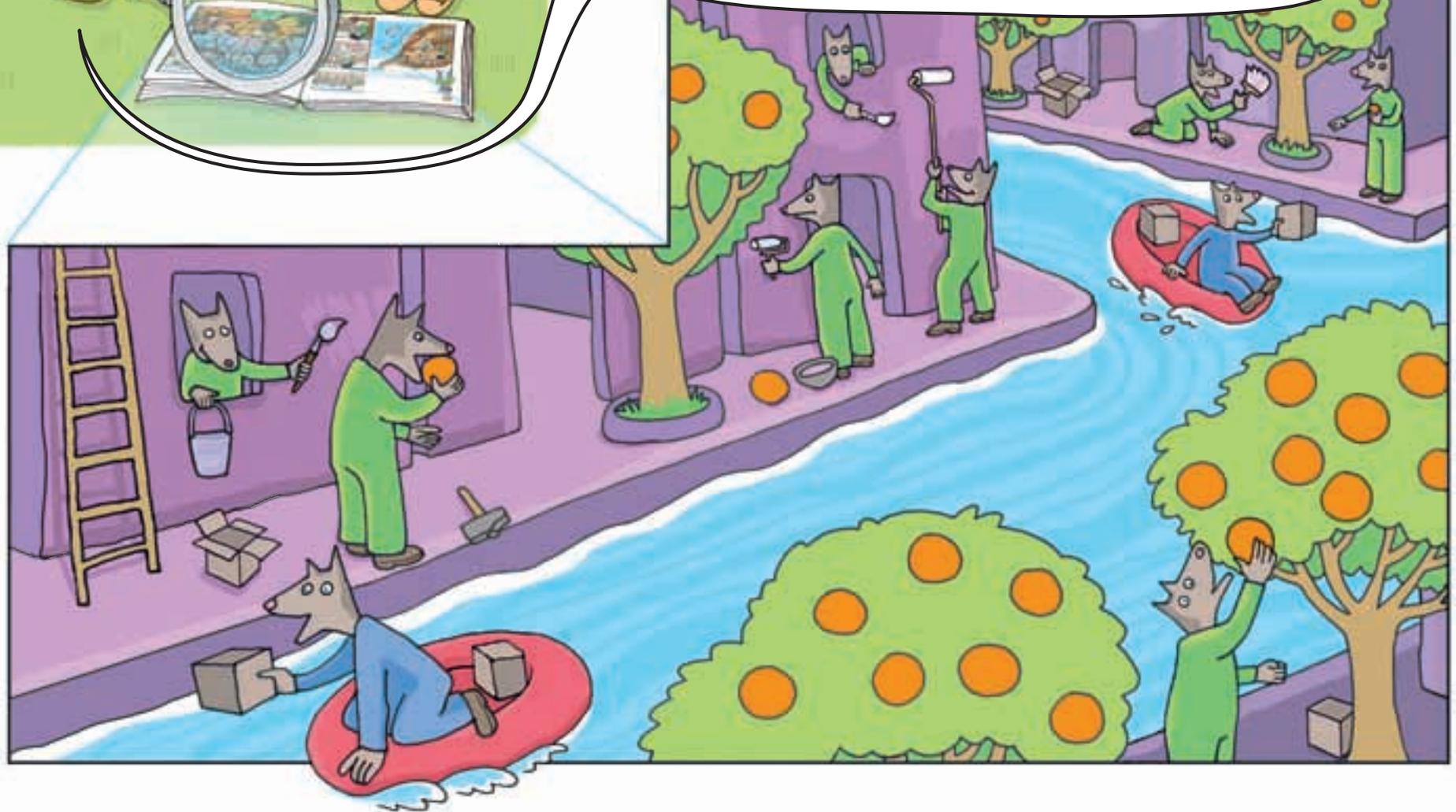
The sailors really like it on the island, but they miss their families and want to get back to their homeland. The natives help them to load the ship: they bring water and a lot of fruit and vegetables. This time the crew doesn't get sick. The mysterious sickness doesn't appear again. They have a happy reunion with their families back at their home port. What can we learn from this story? Dogs don't get scurvy. Fruit and vegetables saved the sailors.





Julien, tell me, why didn't the dog get scurvy?

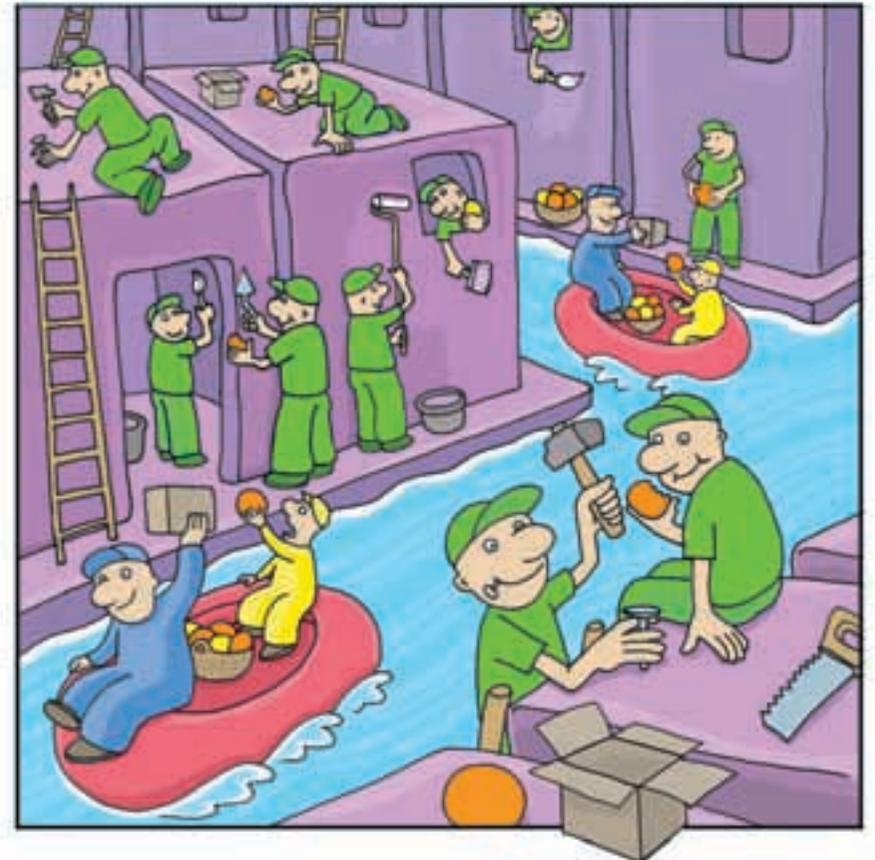
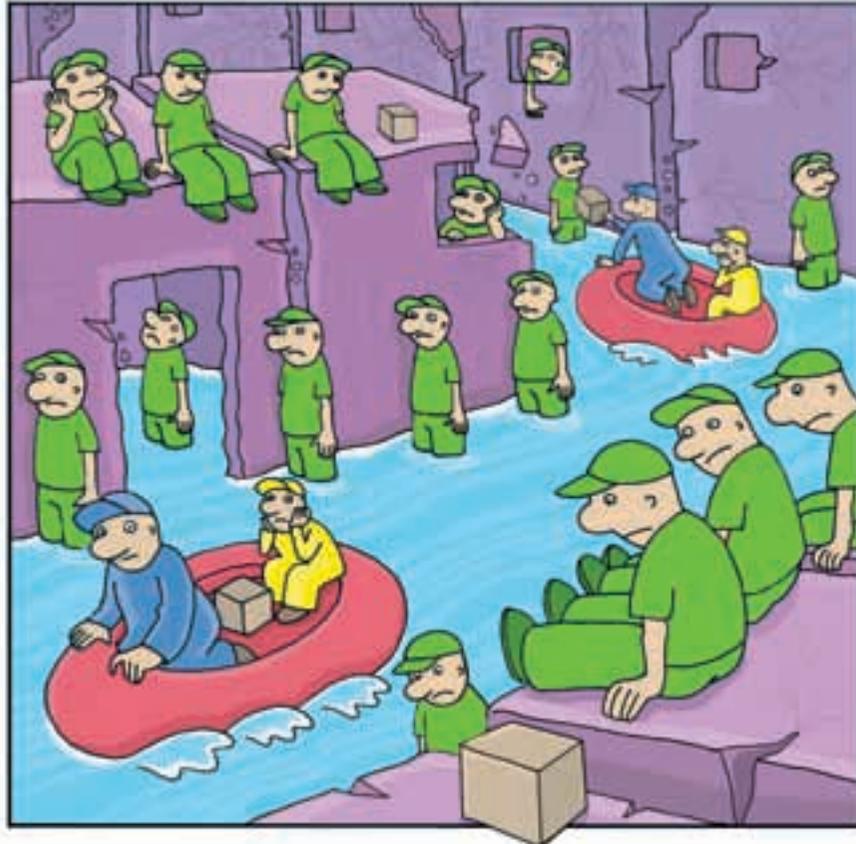
Quite simple: Scurvy is caused by vitamin deficiency. Dogs and most other animals have the ability to produce their own vitamin C. Vitamin C is one of the most important vitamins. If you look at the cells of a dog, you can see what I mean! There are enough vitamins for the cell helpers.



On the other hand, humans can't produce their own vitamin C. This is what it looks like in our cells if we don't eat vitamins. All our little helpers get tired and weak and neglect their cells. The cells get brittle.



When we eat vitamins again, look what happens: All the little helpers are happy again, they have enough energy and can get on with their jobs.

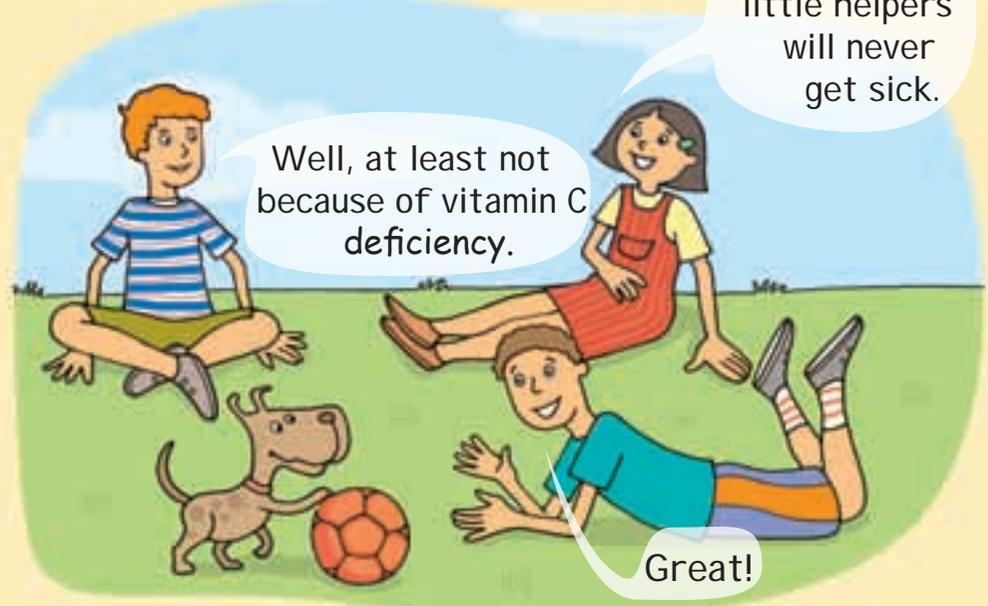


# That's why the dog stayed healthy



Nearly all animals produce their own vitamin C, which is a very important vitamin that the body needs in order to live. We humans need to take care that we eat enough vitamin rich food. Then we don't get sick.

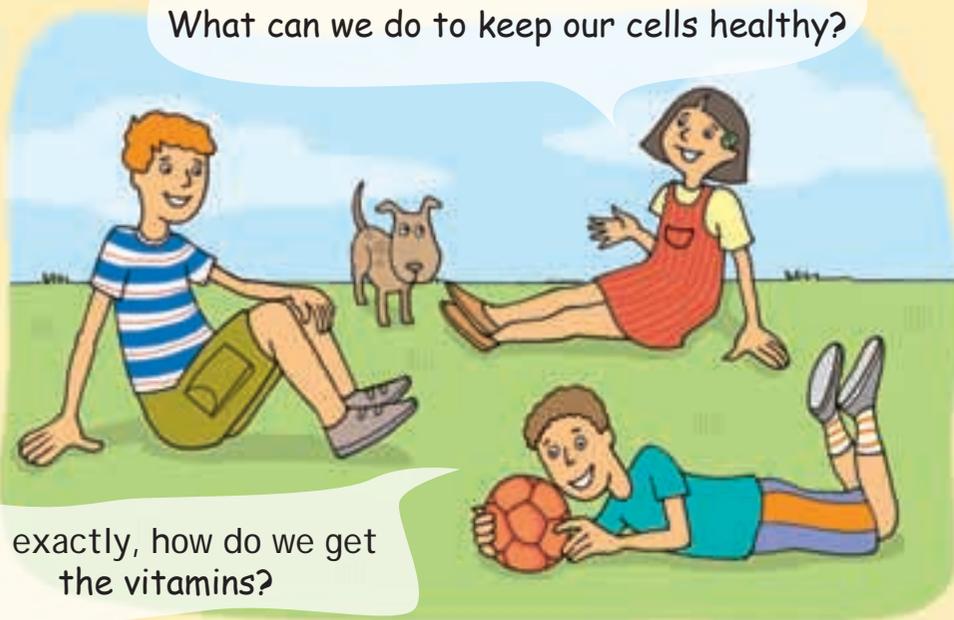
That's great, then Tapsy's little helpers will never get sick.



Well, at least not because of vitamin C deficiency.

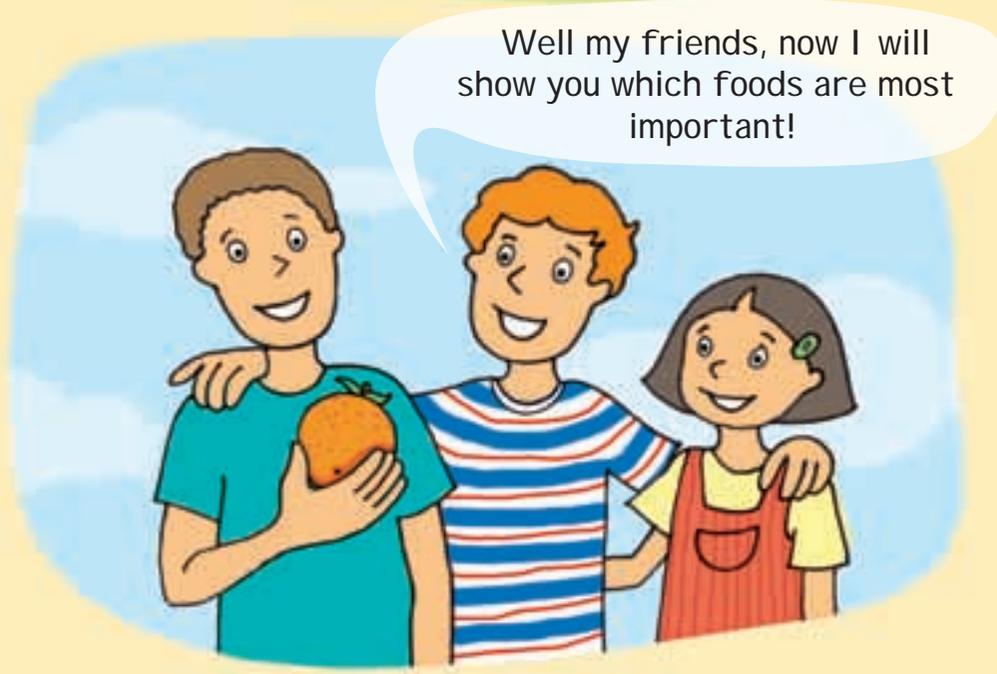
Great!

What can we do to keep our cells healthy?



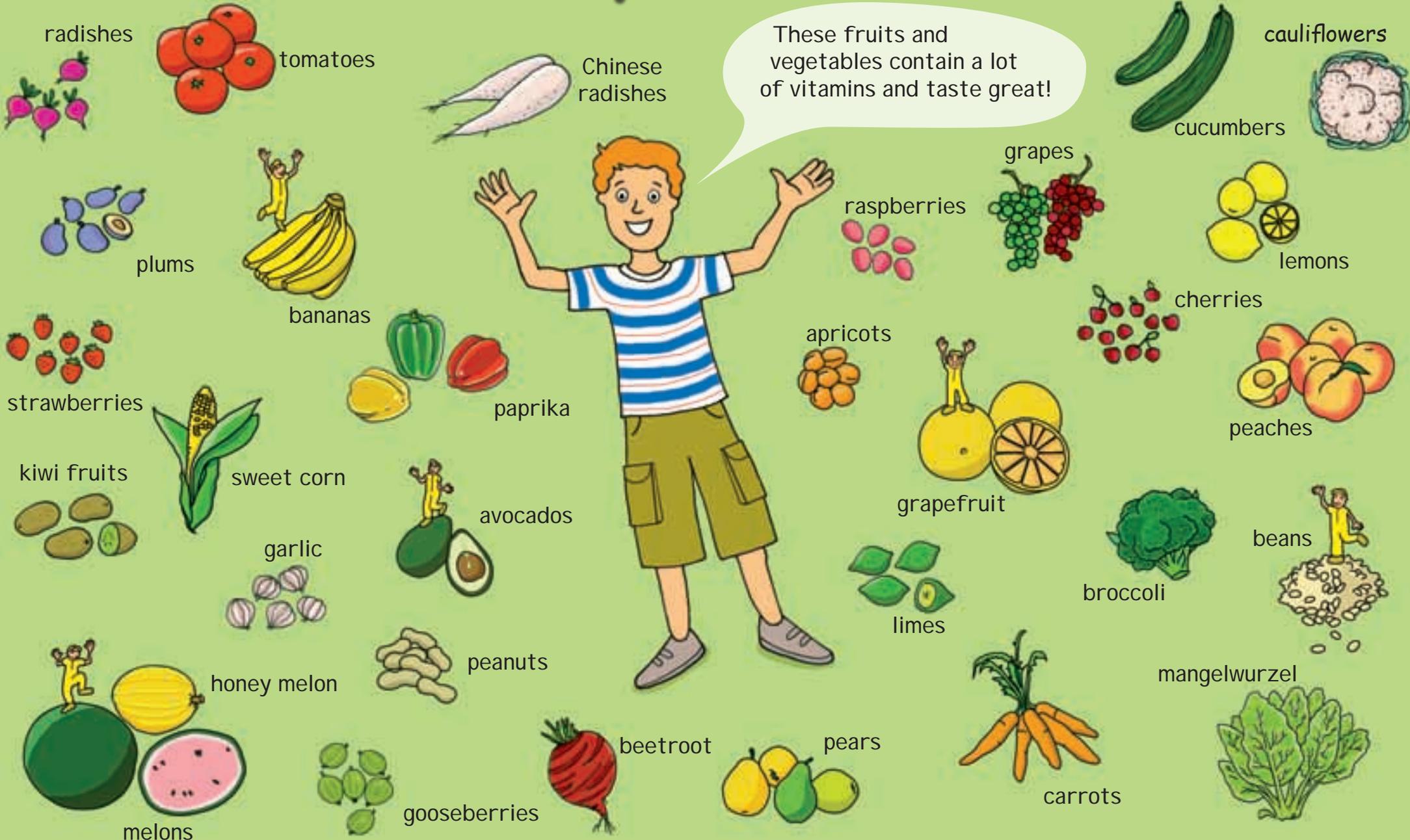
Yes, exactly, how do we get the vitamins?

Well my friends, now I will show you which foods are most important!



# Feed your cells!

These fruits and vegetables contain a lot of vitamins and taste great!





celery



celery root



blackcurrants

blueberries



spinach



pumpkins



chinese cabbage



red cabbage



mangos



oranges

I love vitamins!



potatoes



spring onions

onions



peas



apples



lettuce



milk



chicken



orange juice



oats



bulgur



turkey



rice



nuts



lamb



fruit tea



pineapples



eggs



wholemeal bread



honey



fish



cornflakes



Your nutrient delivery men love this food!

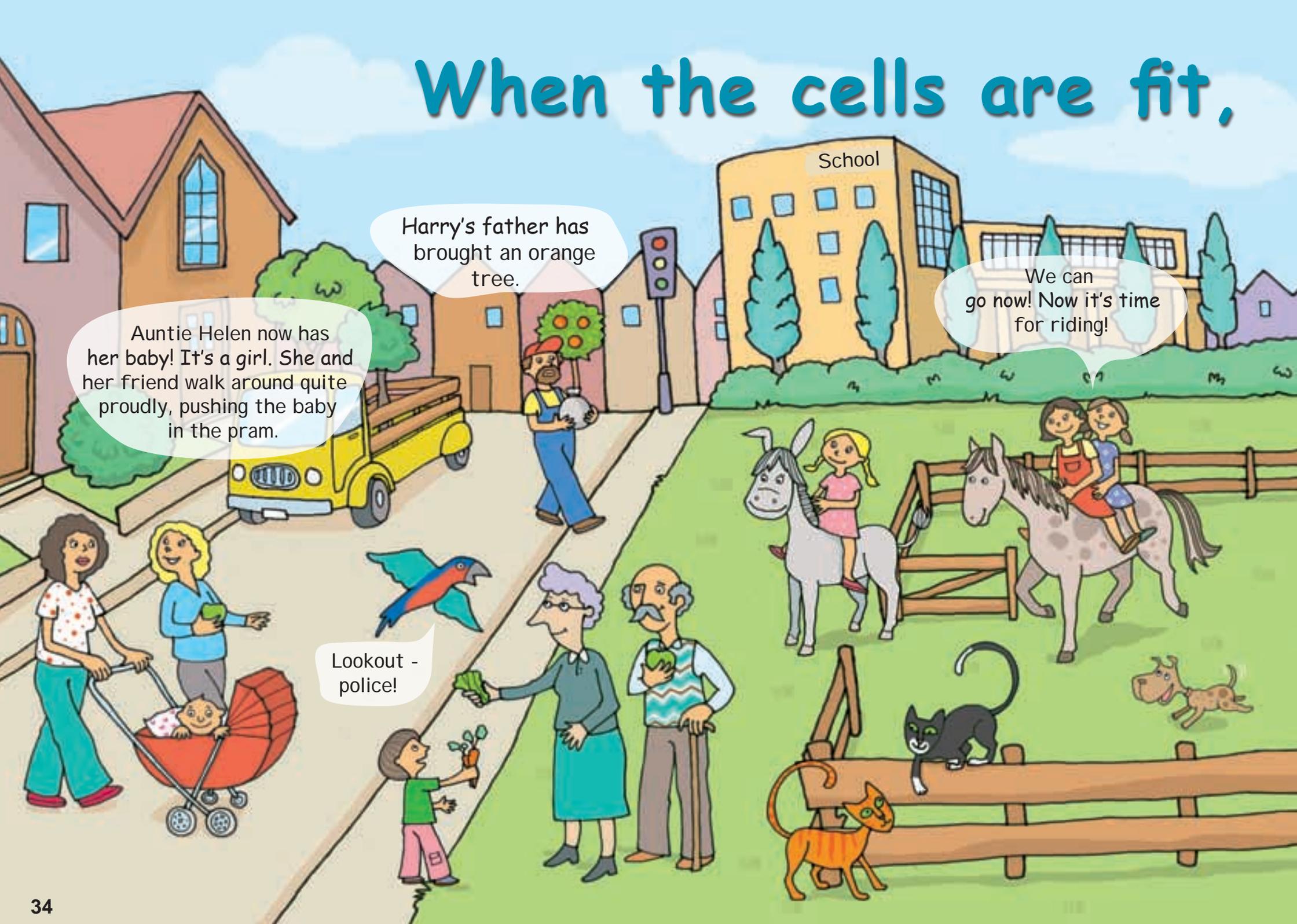
# When the cells are fit,

Harry's father has brought an orange tree.

Auntie Helen now has her baby! It's a girl. She and her friend walk around quite proudly, pushing the baby in the pram.

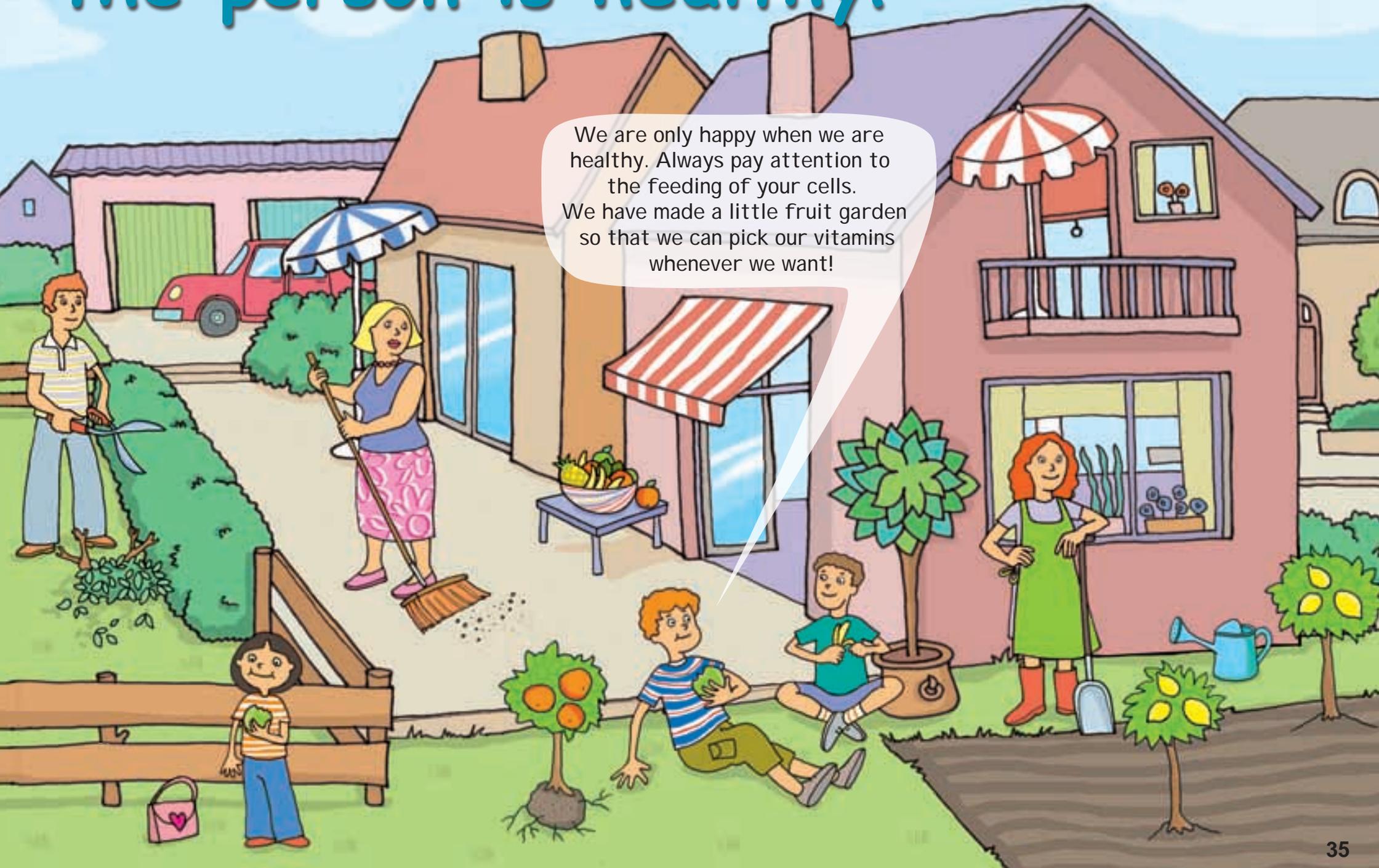
We can go now! Now it's time for riding!

Lookout - police!



# the person is healthy!

We are only happy when we are healthy. Always pay attention to the feeding of your cells. We have made a little fruit garden so that we can pick our vitamins whenever we want!



# On the following pages, it's your turn!

Next, draw around your hand. Then paint inside the shape of your hand. You can also make patterns. Let your fantasy run freely.





What do you think?  
Which foods contain a lot of vitamins?  
Please tick!





Compare the two pictures! The picture on the right has ten differences to the picture on the left. Can you find them?



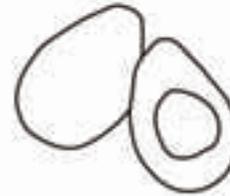
Please colour in!  
Take a few coloured pencils and colour in these fruits.  
Can you name them? Then write the names underneath!



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# Recipe for a fruit salad

A fruit salad is healthy and tastes great!  
You can use almost any fruit for this, depending on availability and season. This recipe is very simple:

For 2 people:

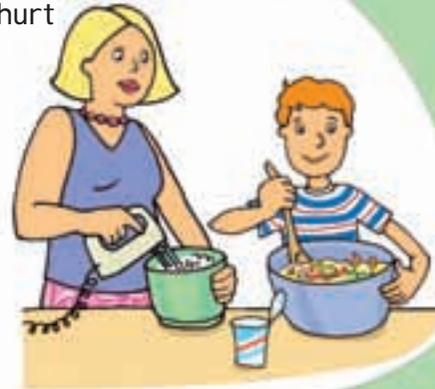
- |                       |                           |
|-----------------------|---------------------------|
| 2 bananas             | 1 cupful of cream yoghurt |
| 2 medium sized apples | 1 cupful of whipped cream |
| 2 kiwi fruits         | 200g chopped almonds      |
| 300 g grapes          | 1 teaspoon of butter      |
| 2 oranges             | 1 sprinkling sugar        |



1. Wash the apples and grapes and peel the oranges, kiwi fruits and bananas. Cut them all into small, mouth-sized pieces. Please ask your mother or another grown up if they can help you to do this.



2. Now put all the fruit into a medium sized bowl. Open the yoghurt and gently mix it into the fruit with a large spoon. Now get your mom to whip the cream. When it's stiff, mix it into the fruit salad.

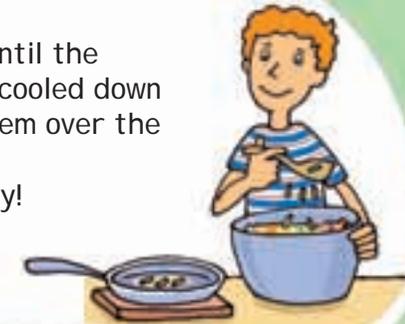


3. Now place the bowl in the fridge for ten minutes.

4. Heat the butter in a pan. When it's runny, put the chopped almonds in the pan and roast them until they're golden brown. Please stir continuously! Finally, sprinkle the almonds with sugar.

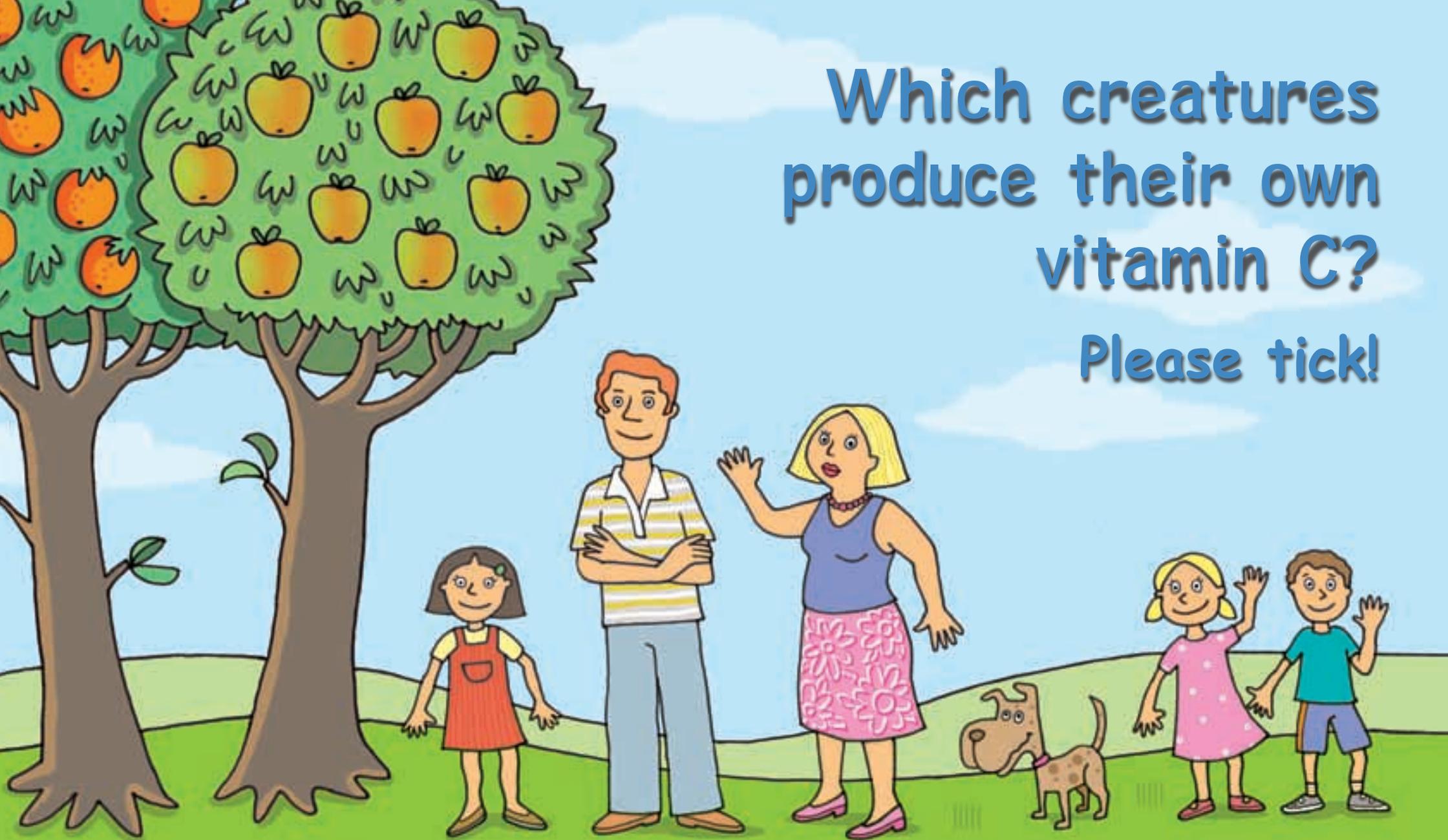


5. Now wait until the almonds have cooled down and spread them over the fruit salad. Finished! Enjoy!



Which creatures  
produce their own  
vitamin C?

Please tick!



# Plant your own apple tree!

All that you need is an apple, a small bowl, two or three earthenware flowerpots, some sandy soil and a glass of water.



1. Take the seeds out of the apple.

2. Leave them on the windowsill to dry for a few days.



3. Then put them in a glass of water and let them soak overnight.



4. The next day, prepare the flowerpots: fill them with sandy soil until the rim. The soil should be damp, but not wet.



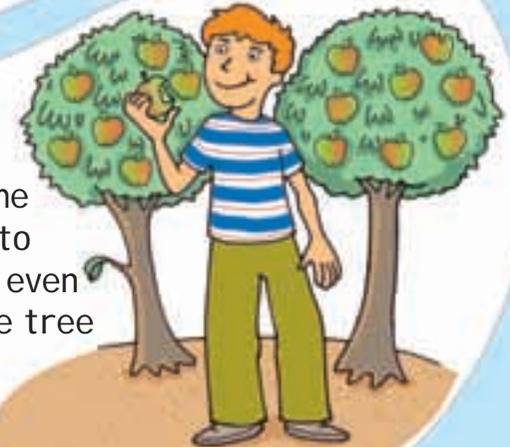
5. Make four or five holes in the soil of each pot, each about four cm deep. Put the seeds in and cover them with soil.



6. After a while, the seeds should begin to grow shoots.



7. It takes a long time for the little plants to grow big, sometimes even a few years. An apple tree is a friend for life.



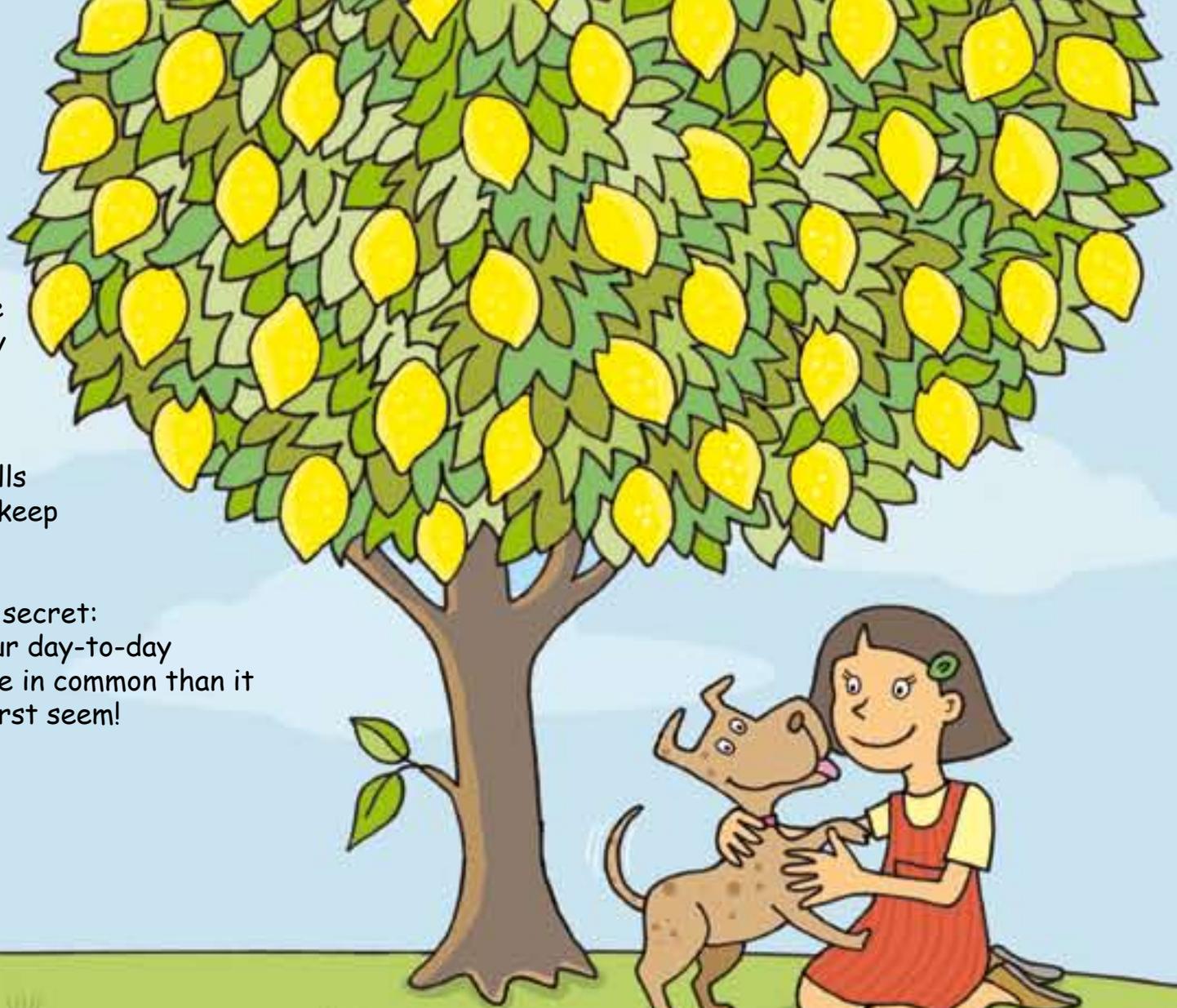
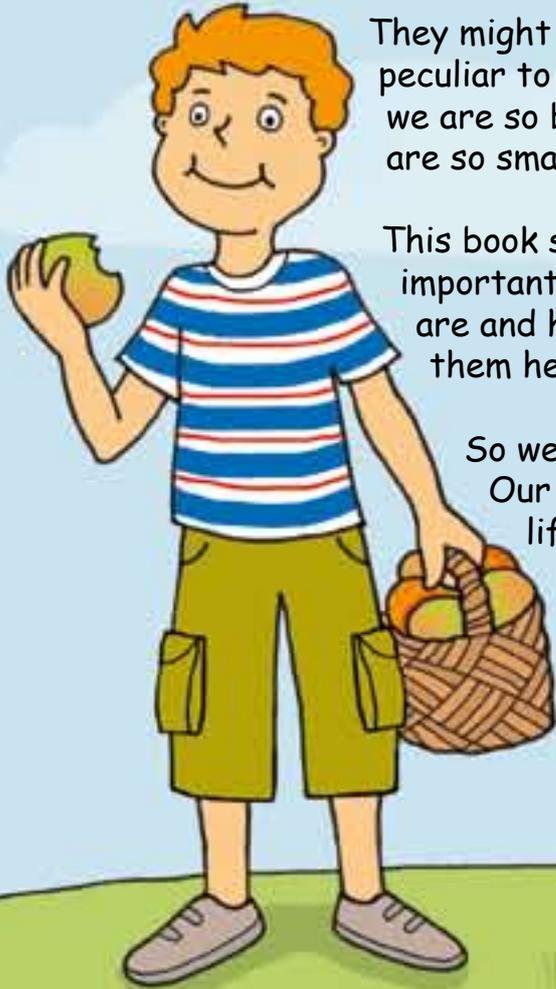
## Cells, the secret of life.

Our body consists of billions of cells.

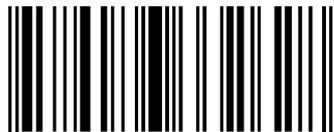
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This book is part of a campaign to teach children a better understanding of health and nutrition.

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