

WHERE DO MEDICINES COME FROM?

KEY STAGE 1 STORY – TEACHER’S NOTES

Slide 1

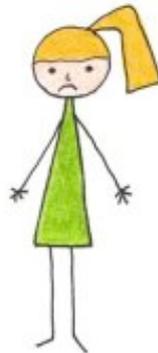
This is Ellie.

Ellie is a happy girl - but tonight she feels sad.

Her head hurts.

Her throat hurts.

Ellie feels poorly!



Points to discuss:

Have the children felt poorly?

Can they sympathise with Ellie?

What sort of illnesses have they had?

What makes you ill?

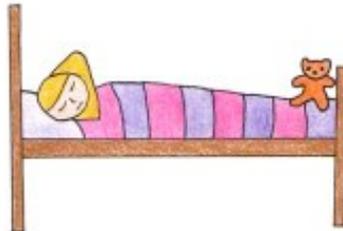
Bacteria and viruses eg colds and tonsillitis, allergies eg asthma and eczema, problems with the way your body works eg diabetes

Slide 2

Tucked up snugly in her bed,
Ellie hopes she feels better tomorrow.

If not, she might need some medicine.

Soon she is fast asleep
and dreaming ...



Points to discuss:

What is medicine?

A medicine is a drug which helps you to feel better or get better

What is a drug?

A drug is a chemical which changes the way your body works. Used properly, they can be helpful and make you better. But all drugs, even ones which help you when they are used properly, can make you very ill if you take too much of them

What do medicines do?

- *make you feel better – eg painkillers like Calpol™ stop your head hurting etc*
- *make you better - eg by killing the bacteria which make you feel ill (these medicines are called antibiotics)*
- *keep you well eg people with diabetes need to take insulin regularly to keep them well, some people with asthma need to use inhalers every day to keep them from having asthma attacks*

Slide 3

Ellie dreams she is at the doctor's.

Dr William smiles at her.

He looks in Ellie's ears.

He feels Ellie's neck.

He looks at her very sore throat while Ellie says 'Aaaah!'



Points to discuss:

Have you ever visited the doctor?

What are doctors doing when they look in your ears and throat?

Looking to see if they are infected/red/swollen.

Why does the doctor ask you to say 'Aaaah'?

So (s)he can see clearly down past your tongue to your tonsils

Why does the doctor feel your neck?

To see if your glands are swollen. The glands are part of the defence system of your body. If you are under attack by germs the glands are very busy fighting them off, and so they swell up.

Slide 4

'Poor Ellie! You've got tonsillitis,' says Doctor William.

'I'll give you some medicine to help you get better.'

'Thank you' says Ellie 'But where does my medicine come from?'

'Try the pharmacist!' smiles Dr William ...



Points to discuss:

Have you had tonsillitis?

What is it?

An infection of your tonsils in your throat caused by bacteria

How does a doctor give you medicine?

Doctors write a prescription for you – this gives instructions to the pharmacist about which medicine you need. They wouldn't really give a prescription to a little girl like Ellie – they always give prescriptions to an adult because medicines are dangerous if they are taken by the wrong person or in the wrong amount.

What sort of medicine can help if you have got tonsillitis?

Antibiotics (like amoxicillin and penicillin) which you get from the doctor to kill the bacteria and help make you well; painkillers like CalpolTM which make you feel better.

Slide 5

In her dream, Ellie visits Neela at the pharmacy.

There are lots of things to look at!

Neela mixes Ellie's medicine in a special bottle.

'Thank you' says Ellie 'But where does my medicine come from?'

'Fred brings it in his lorry' answers Neela with a smile.



Points to discuss:

What is a pharmacist?

A pharmacist is an expert on medicines and how to take them so that they work as well as possible. They will give you the medicine prescribed by your doctor, and tell you how often to take it, whether you need to take it with food or when your stomach is empty etc.

Pharmacists can also give advice on 'over-the-counter' medicines which you can buy, like indigestion tablets and painkillers. Like the doctor, a pharmacist would never really give a medicine to a child as young as Ellie because any medicine can be dangerous if it is taken by the wrong person or in the wrong amount.

Slide 6

Ellie looks up and up into the lorry cab.

'Can you tell me where my medicine comes from?' she asks Fred.

'I get it from the medicines factory.'

It's a long way away and very, very big!' says Fred



Points to discuss:

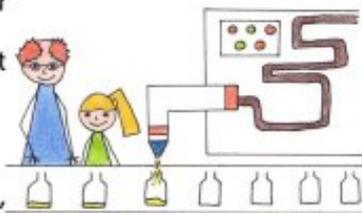
Medicines often travel a long way from where they are made – they are not manufactured by the pharmacist. Often medicines are transported as pills or powders which the pharmacist has to mix with water to turn into the liquid medicine we take. Some medicines have to be transported in specially cooled lorries if they have to be kept cold to make sure they work properly.

Slide 7

Ellie sees a huge machine putting yellow powder into bottles.

'That's your medicine' says Mr Edward, who looks after the factory. 'We make tonnes of it here!'

'Thank you' says Ellie politely 'But where does my medicine REALLY come from?'



'Ah' says Mr Edward ' You need to talk to the doctors at the medicines company...'

Points to discuss:

We use huge amounts of medicines each year- there are around 792 million prescriptions written in the UK alone each year, without over-the-counter medicines. Medicines are made in massive industrial plants which have to have incredibly strict hygiene regulations. If Ellie REALLY visited a pharmaceutical factory, she would have to wear her hair under a hat (not easy!!) and a special overall, just like everyone who works there.

From Mr Edwards onwards, everyone Ellie meets works for a pharmaceutical company, called 'medicines company' for ease of reading. These big companies carry out all the stages of making medicines from the first research to find possible new medicines to final manufacturing on a massive scale.

Slide 8

'We are testing a new medicine,' says Dr Felix.

'We try to make sure it works well and is safe to use by giving it to some of our patients,' adds Dr Sarah. 'George has tried this one for us'

'Yes, and I'm feeling much better now.' says George

'Thank you,' says Ellie 'But I'm still not sure where my medicine comes from.'

'Talk to our company scientists!' smile the doctors.



Points to discuss:

Why are medicines tested on people?

Because it is the only way to work out exactly which dose works best – doctors always want to use the smallest dose of medicine possible that works. It also helps to find out whether there are any side effects. Some medicines will cure one illness but make you feel poorly in a different way. This is known as a side effect. Most side effects are very mild, and very rare. The benefits from the medicine outweigh any slight risks. But it is important to find out what the side effects, if any, of a new medicine might be.

Slide 9

'We do thousands of tests on every new medicine' says Dr James, busy in the laboratory.

'We have to answer two big questions - will it make you better and is it safe?'

'Thank you,' says Ellie 'But I'm still not sure - WHERE does my medicine come from?'

'You need our research team' grins Dr James. 'Off you go ...'



Points to discuss:

Laboratory testing involves looking at the effect of the medicine on cultures of microorganisms and on human cells and tissues grown in the lab. This is also the stage where new medicines are tested on animals – again looking at safety and dose levels as well as effectiveness. If this is an area you want to explore with pupils, more information can be found at www.abpi.org.uk/amric/amricpublications.asp.

Slide 10

Ellie peeps out in surprise from some enormous leaves. What a strange dream this is!

'I'm looking for living things which might make people better,' says Thomas, a rather special scientist.

'The ideas for some of our best medicines come from plants, fungi and bacteria!'



Points to discuss:

What sort of medicines come from fungus?

Antibiotics like penicillin.

What sort of medicines come from plants?

Digitalin from foxgloves is used to help people with heart problems and tamoxifen, a cancer treatment, comes from yew trees. Tropical rainforests contain thousands of sorts of animals and plants which we haven't even discovered yet. Scientists look at plants used by local people for healing as well as looking for new species. But the rainforest is being destroyed faster than we can find the medicines – this is one reason why rainforest destruction is so serious.

Slide 11

Ellie blinks – and the plants are gone.

She's back in a laboratory.

Patrick and Yasmin are busy testing chemicals to see if any of them might make a good medicine.

Ellie thinks they look VERY busy!



Another blink and..

Points to discuss:

Scientists try out hundreds of thousands of chemicals to see if they might make useful pharmaceuticals. They also make completely new chemicals, often using what they know about naturally occurring molecules or computer models of what might work.

Slide 12

..she is looking at a computer!

Anna uses computers to help find out which chemicals will make the best medicines.

'All new medicines start off with people like Patrick, Thomas, Yasmin and me' she explains.

'Oh thank you!' cries Ellie 'Now I know the answer to my question...'



Points to discuss:

How are computers used to find new medicines?

They are used to model the microorganisms which cause disease, and the chemicals in the body which are affected by disease, and to design new molecules which might interfere with the way an illness works and make us better. It is very complicated but often very successful.

How long does it take to develop a new medicine?

Up to twelve years from the first ideas to the medicine available for doctors to prescribe!

How much does it cost to develop a new medicine?

Around £500 million!

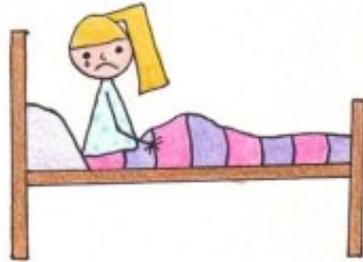
Slide 13

Ellie wakes up.

Her head still hurts.

Her throat still hurts.

Ellie **STILL** feels poorly.



'No school for you today!'
says Ellie's Mum.

And she takes Ellie to the doctor's.

Points to discuss:

Why is this more realistic than the dream?

Ellie's mum takes her to the doctors. Children don't usually visit the doctor on their own.

Slide 14

Ellie is at the doctor's.

Dr William smiles at her.

He looks in Ellie's ears.

He feels Ellie's neck.

He looks at her very sore throat while Ellie says 'Aaaah!'



Slide 15

'Poor Ellie! You've got tonsillitis' says Doctor William.

'I'll give you some medicine to help you get better.'

'Thank you' says Ellie 'And do you know what? I know EXACTLY where my medicine comes from!!'



Points to discuss:

At this stage it is helpful to run through the stages of the development of a medicine with the children in the RIGHT order, starting with the research and moving through to the medicine ready to be used by the doctor, before moving on to the worksheets for the activity.