Section 3.2, Vaccinations, explores how and who discovered vaccines.

In this is a student reading comprehension activity. Students are told a story about Edward Jenner and how he discovered vaccines. This story can either be given in individual student handouts or be read to the class by the teacher. ‘Fill in the blanks’ and ‘answer questions’ activities help reinforce the main points of the story.

The extension activity encourages students to recreate the story of Edward Jenner and his vaccine discovery through fun role play.

**Learning Outcomes**

**All students will learn that:**
- Vaccines help prevent a range of infections, including the flu

**More able students will understand that:**
- There are not vaccines for all infection

**National Curriculum Links**

P2 - P7
- SCN 1-20a
- SCN 2-20a
- HWB 1-15a, 2-15a
- HWB 1-16a, 2-16a
- HWB 1-17a, 2-17a

**Unit of Study**
- Unit 6 – Micro-organisms

**Estimated Teaching Time**
- 50 minutes
3.2 Prevention of Infection
Vaccinations

Our immune system generally fights any harmful microbes that may enter our bodies. Getting plenty of rest, eating the correct foods and getting lots of sleep all help our immune system work properly hence preventing infection.

Another means of assisting our immune system is through vaccinations. Vaccines are used to prevent NOT treat infection. A vaccine is usually made from weak or inactive versions of the same microbes that make us ill. In some cases, the vaccines are made from organisms which are similar to, but not exactly, the microbes that make us ill.

When the vaccine is injected into the body the immune system attacks it as if the harmful microbes were attacking the body. The white blood cells create lots of antibodies to attach to specific markers on the surface, called antigens, of the vaccine organisms. Because the vaccine is an extremely weakened version of the microbe the WBC successfully eliminate all these cells and it will not make you ill. By successfully eliminating all the vaccine, the immune system remembers how to combat those microbes. The next time microbes carrying the same markers/antigen enter the body the immune system is ready to fight it before it has a chance to make you ill.

In some cases, the immune system needs reminding and this is why some vaccinations require booster jabs.

Some microbes like the flu, are tricky. They evolve so fast changing their markers/antigens. This means that the immune system can't remember how to fight them. For this reason, we have annual flu vaccinations.

Key Words
Antibody
Antigen
Bacteria
Disease
Immune system
Immunise
Vaccination
Vaccine
Virus

Materials Required Per Student
- Copy of SW 1
- Copy of SH 1
- A white board (not necessary)

Available Web Resources
- A demonstration of this activity.

FASCINATING FACT
The word vaccine comes from the Latin word vacca meaning cow, so named because the first vaccine was made from the milder cow pox disease.

Advance Preparation
1. Copy of SH 1 and SW 1 for each student
1. Begin the lesson by explaining to the class that although there are many harmful microbes that can make us ill, in some cases, there are things we can do to prevent this happening.

2. Explain to the class that vaccinations are a harmless small amount of the microbe/disease markings/outer coat which teaches our body how to fight the bad microbe when or if we get attacked by the disease. Discuss with the class their experiences of vaccinations, which vaccinations they remember getting and when they got them.

3. Show the class images of the disease and bacteria/virus which they have been immunised against. (Available at www.e-bug.eu) Emphasise to the class that in the 1700s these diseases were extremely common.

4. Highlight to the class that without their vaccinations, many of the class would not have survived past 5 years of age. Explain that things like whooping cough, polio and TB are now extremely rare due to vaccinations.

5. Remind students that some microbes change their outer coats like we change our clothes. Some microbes change their markings/coats so quickly that scientists cannot create vaccines for many infections or they have to make a new vaccine every year, like the flu vaccine.

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**Main Activity**

1. Provide each student with a copy of SW 1.

2. Read the story of Edward Jenner (SH 1) to the class, either show the story to the class on the whiteboard or provide each student with a copy of SH 1. The class can then read along with the story.

3. After reading the story, ask the class to fill in the spaces on their worksheet.

4. Students should also answer the questions at the bottom of the worksheet.

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**Plenary**

1. Check for understanding by asking students
   a. What are vaccines?
      *Vaccines protect a person against a particular disease. They are dead or severely weakened versions of the microbe.*
   b. When should vaccines be used?
      *Vaccines should be administered before an illness occurs, vaccines are a preventative measure.*
   c. Who discovered vaccines?
      *Edward Jenner discovered vaccines in 1796.*

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**Extension Activity**

After reading the story of Edward Jenner, students should recreate the story into a play to present to the class. An example script can be found in SH 2 which was written and performed by class 12 at Elmbridge Junior School. This play can be viewed at www.e-bug.eu.
Edward Jenner was born in 1749. As a young boy, Edward enjoyed science and nature spending hours on the banks of the River Severn looking for fossils. In 1770, at the age of twenty one, he began training as a doctor in London. Two years later Edward began to practise as a doctor in his home town of Berkeley, Gloucestershire.

During this time, people were terrified of a horrible disease called smallpox. People who got this disease got severe scarring and sometimes even died! As a doctor, Edward Jenner listened to what the country people said about smallpox. They believed that someone who caught a different mild infection called cowpox from their cows would not catch the much more serious smallpox.

Jenner decided to carry out an experiment to see if the people were right. In 1796 a milk maid called Sarah Nelmes came to Jenner complaining of a cowpox rash on her hand. Jenner took some of the pus from the cowpox rash on Sarah’s hand. He scratched some of the pus into the hand of an 8 year old boy called James Phipps, the son of his gardener. James fell ill with cowpox but soon recovered.

Jenner then took some pus from someone with the dangerous disease, smallpox, and scratched this into James’ arm. James developed a scab but did not develop smallpox, Jenner guessed correctly. Jenner’s discovery came to be known as vaccination from the Latin word for a cow: vacca. Jenner went on to vaccinate all the local children with the cowpox to stop them from getting the more dangerous smallpox disease.
Edward Jenner was born in 1749. As a young boy Edward enjoyed science and nature, spending hours on the banks of the river Severn looking for fossils.

In 1770, at the age of 21, he began training as a doctor in London. Two years later Edward began to practice as a doctor in his home town of Berkeley, Gloucestershire. At this time smallpox and cowpox were a problem!

Oh come in come in, what seems to be the problem Mr and Mrs Smith?

Well Dr Jenner, my husband has got himself a cowpox rash. What can be done for him?

Also doctor, a friend of mine died last year from smallpox. But he never had cowpox.

Yes, do go on Mr Smith.

Well, I know lots of other people who have had cowpox but then never got smallpox. Do you think this means I won't get it doctor?

You know Mr Smith, you are not the first patient to say that to me. I have my suspicions that you are correct. I will investigate the matter.

And the good doctor did just that. When milk maid Sarah Nelmes came to Dr Jenner with a cowpox rash he took the opportunity to experiment with the help of an 8 year old boy, James Phipps.

Sarah, I’ve got a cowpox rash on my hand.

OK Miss Nelmes, let me take a look at that. Right young James, come here please and hold out your hand.

What are you doing doctor?

An experiment Miss Nelmes. I shall take some of the pus from your rash and scratch it into James’ hand.

James fell ill with cowpox but soon recovered. Dr Jenner was ready for part 2 of his experiment. It was now that the doctor scratched some pus from someone with smallpox into James’ arm.

James my boy, if all goes to plan your name will go down in medical history!

But what if it doesn’t go to plan Dr Jenner?

I won’t lie to you James, you might well die!

(Gulps) Oh!

But James didn’t die. Jenner had guessed correctly and in time his discovery came to be known as vaccination. He then went on to vaccinate all the local children with cowpox to stop them getting smallpox. Even today his work is still recognized and Gloucestershire Royal Hospital have a unit named after him.
Reading Comprehension

Can you fill in the blanks in the story from the words in the box below?

Edward Jenner was born in ___________________, England. As a young boy Jenner’s favorite subject was ___________ and when he grew up he became a ___________. At the time the people of England were terrified of a deadly disease called ___________. Symptoms included severe ___________ and many people died. Jenner noticed that milkmaids who caught the harmless infection ___________, from their milking cows did not die from smallpox. Jenner took pus from the hand of a ___________ who had cow pox and infected a boy called ___________. The boy got infected with cowpox but soon recovered. Jenner then ___________ James with smallpox. A _______ developed but the boy did not develop smallpox. Jenner was delighted that his idea was correct, he went on to __________ all the children in his town with cowpox to stop them getting smallpox.

Understanding

Answer the following questions:

1. What was the name of the doctor who discovered vaccinations?
   ____________________________________________________________

2. What was the name of the deadly disease at the time?
   ____________________________________________________________

3. What was Jenner’s idea to stop the deadly disease?
   ____________________________________________________________

4. What happened to James after he was infected with the cowpox?
   ____________________________________________________________

5. What happened to James after he was infected with the smallpox?
   ____________________________________________________________

6. Why was it important for Jenner to test his idea on James before treating lots of children?
   ____________________________________________________________

Fascinating Fact

Vaccination comes from the Latin word for a cow – vacca.