



IMMUNE PATROL

Teacher's Manual



World Health
Organization

REGIONAL OFFICE FOR

Europe



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INTRODUCTION

Dear teacher,

What you have in front of you is a free digital learning game platform provided by the World Health Organization (WHO), Regional Office for Europe to help you teach children about the immune system and vaccination. It contains material for 6 lessons, each of a duration of 90 minutes.

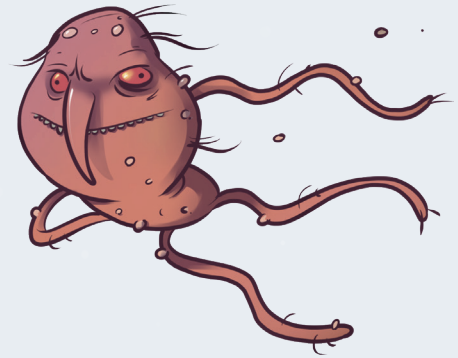
The aim of this learning game is to help pupils aged 10-12 develop a scientific mindset and apply it to the specific topic of immunology. The material is presented as a game in order to make the experience not only educational, but also fun and engaging. In the long run, WHO's goal is to increase awareness about vaccination through facts and education.

Since vaccination does not currently have a place within school science curricula, much of the information about vaccines available to the public is derived from nationally sponsored campaigns, media stories and various online sources. Many people with vaccine-related questions search online to find answers. Unfortunately, the information found there can be fragmented, incorrect or deliberately misleading.

Schools are a unique platform through which WHO can reach parents and future parents with evidence-based information. As a teacher, you work every day to increase your pupils' knowledge and resilience to misinformation. Ideally this learning game should help you build your pupils' scientific literacy skills, while introducing the concepts of immunization and vaccines. The overall aim is to increase pupils' ability to make well-informed decisions in the future.

It is important to stress that WHO does not intend to tell pupils what to think. The aim is to present the facts and urge them to draw their own conclusions.

Read about how this material fits into your curriculum in the chapter about learning goals and scientific literacy.



ABOUT THE GAME

Immune Patrol combines a digital game with classroom activities. The overall narrative is that the pupils are the immune system of their avatars, and by learning about the immune system, infectious diseases, and vaccination, they get better at protecting their avatars. The classroom activities include preparing and making presentations, creative writing, theatre, testing a thesis by means of a game app, and more.

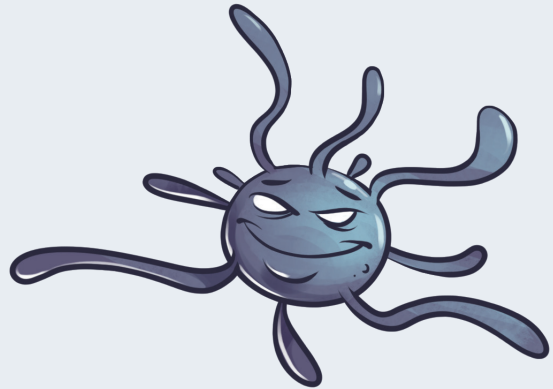
The game is browser-based and is meant to be played on a smartboard or projector or computer (by the teacher) and a device (computer or tablet) for each group of pupils. We recommend using Google Chrome if possible.

Each lesson has the same structure:

- 1. Video** - The entire class watches an explainer video together.
- 2. Login** - The pupils log in to the game using a unique code.
- 3. Avatar** - The pupils make their avatars prior to Lesson 1 and can adjust them throughout the game.
- 4. Classroom activities** - In each lesson the pupils are given tasks. The tasks are introduced by the teacher and completed in groups.
- 5. Presentations and assessment** - The pupils present their work and their overall performance is assessed by the teacher.
- 6. Battle game** - Each group fights an invader in a short deduction and action game. There is a direct link between the teacher's assessment and how many resources they have available in the Battle game. The Battle game also reinforces key learning points from the lessons.

NOTE:

Later in this manual you will find descriptions for pre-tasks in a Lesson 0. We recommend doing this prior to starting the actual game with the pupils. The pre-tasks are done entirely offline.



CHAPTER 2 - LEARNING GOALS AND SCIENTIFIC LITERACY

While vaccination as such is not part of the science curriculum for pupils aged 10 to 12, learning to think and act scientifically is an essential part, and is considered by the Organization for Economic Co-Operation and Development (OECD) as essential for a successful life (see Programme for International Student Assessment (PISA), 2015: Draft Science Framework).

The material provided in this game aims to increase scientific literacy, which, according to the OECD definition, is “the ability to engage with science-related issues, and with the ideas of science, as a reflective citizen.” PISA 2015: Draft Science Framework <https://www.oecd.org/pisa/pisaproducts/Draft%20PISA%202015%20Science%20Framework%20.pdf>). Scientific literacy is the backbone of science, technology, engineering and mathematics subjects in European school curricula.

The three main competencies required for scientific literacy are defined as follows:

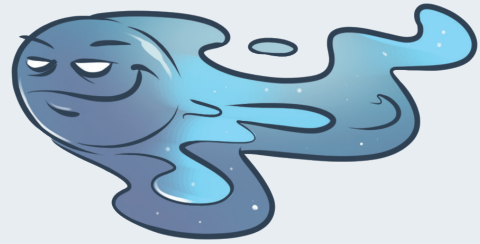
- Explain phenomena scientifically.
- Evaluate and design scientific enquiry.
- Interpret data and evidence scientifically.

Using these competencies requires knowledge: Without a general frame of reference, it is impossible to “know what you do not know”.

The overall “content knowledge” (see PISA, 2015 for a description of this terminology) of this material can be summarized as:

- Knowledge about the immune system.
- Knowledge about vaccination.
- Knowledge about infectious diseases.

For each lesson, there are specific learning goals. The goals are divided into competencies and content knowledge. You can find these descriptions in the “To the teacher” sections of the assignments, and in the “Step-by-step” section of this manual. The specific learning goals are introduced as you progress with the game.



CHAPTER 3 - VACCINATION: DO I KNOW ENOUGH ABOUT THIS?

As a teacher you do not need to possess any pre-knowledge about vaccination or the immune system to use this game. In a plain and easily understood manner, the game takes you and the pupils through the basics of the key areas: the immune system; disease outbreaks; vaccines – how they work and how they are developed; herd immunity and searching online for scientific information.

For more in-depth information, the game also offers a mini-encyclopedia. Everything is presented in a tone and language which pupils aged 10-12 years will understand and can relate to.

When it is time for you to assess the pupils' work, you will do so based on how well they performed the task and worked with the information provided. You will not rate them based on their knowledge of vaccination and the immune system.

Evidence-based information in line with national recommendations

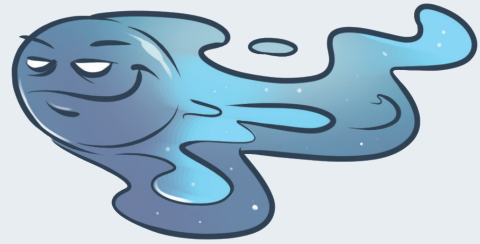
The intention of the game is to present objective scientific facts, and to help pupils understand, discuss, play and work with these facts. This will prepare them to make decisions about their own health, now and in the future. It will also strengthen their ability to understand basic scientific and public health concepts, and to think critically about scientific information available online.

National health authorities recommend vaccination, and the school system can play an important role in making information about vaccination available to parents and pupils..

The contents of the game are in line with the curriculum for science topics [add more info specific to the individual country where the game is launched].

What if some parents are against vaccination?

Some parents or pupils may not support the idea of vaccination. They may be concerned about the safety or effectiveness of vaccines. Some may have heard rumours or read inaccurate information online about vaccines.



If a parent questions the necessity or appropriateness of using the game, we would advise you to do the following:

- Explain that the game is about health science and presents how the body works. Working with vaccines and the immune system helps pupils understand their own body, as well as important public health concepts. It improves their ability to understand scientific concepts and assess scientific information available online.
- Make it clear that the game presents evidence-based facts which are relevant for all; also for those who may decide not to vaccinate. The game does not tell children what to think or do. It inspires them to make their own choices.
- Reassure them that the game does not cast judgement on anyone; also not those who refuse vaccination. Pupils who are not vaccinated will not feel uncomfortable playing the game.
- Refrain from engaging in a discussion regarding specific vaccination topics. If prompted, you may refer to the fact that there is overwhelming scientific consensus in favour of vaccination and that WHO and the health authorities in your country recommend vaccination. As a person who is not a vaccination expert you may say that you are referring to their advice.



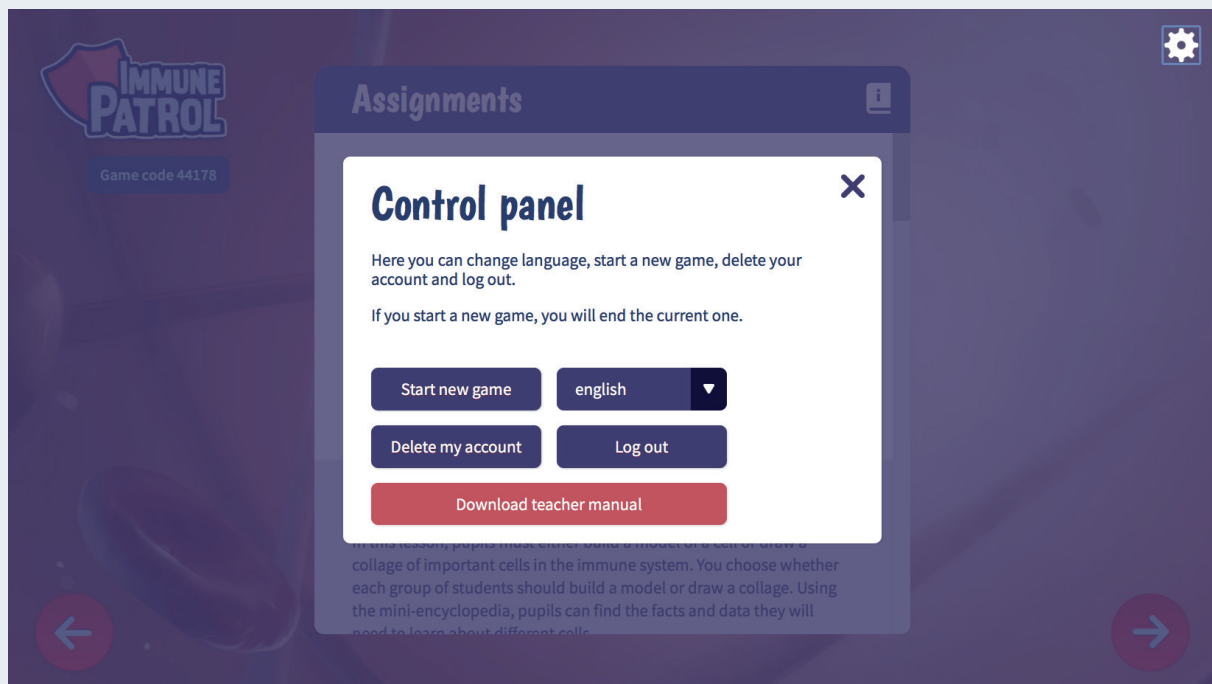
CHAPTER 4 - PLAYING THE GAME

In this section we will describe in detail how to run the game and what is in the different lessons - including Lesson 0. We recommend that you log in to the game now and use the remainder of this manual for reference while reviewing the content.

Creating and starting a game

If you are logging into the game for the first time, you will be automatically led through the process of creating a new game. If at any other point you want to start a new game, click the cogwheel in the right-hand corner of the screen to get to the control panel. Once the control panel is open, click the button “Start new game”.

The first time you visit the game, we recommend watching the welcome video.



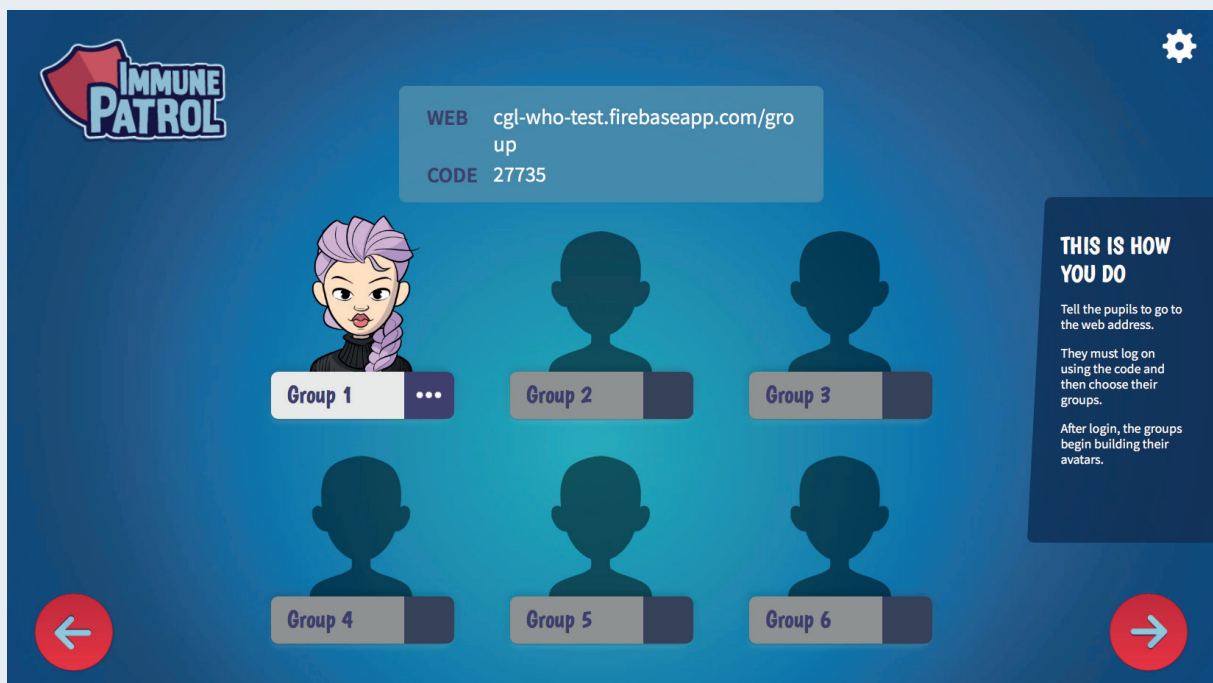


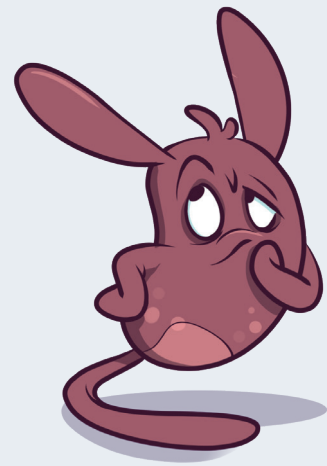
Pupil logins

When you progress through the set-up of the game, you automatically arrive at the group page. This is where your pupils need to log in.

1. Divide your class into groups and give each group a number. Make sure each group has a computer or tablet.
2. Ask your pupils to open a web browser and go to the link shown at the top of the screen.
3. Ask your pupils to log in, using the code at the top of the screen.
4. Once your pupils log in, they will be asked to select a group. Ask them to select the group number you have given them.

Once the pupils are inside the game, they will be asked to build an avatar - that is, a computer persona. During the game, this persona will be infected with various diseases. You should wait for your pupils while they finish building their avatars (tip: When your computer screen refreshes, the avatars will appear if the groups are done working on them). When the pupils are done, push the red button with the arrow at the corner of the screen to start the first lesson.





Closing and restarting a game

At any point you can close the browser window and end the game. It will remember where you are and continue from there next time you log on.

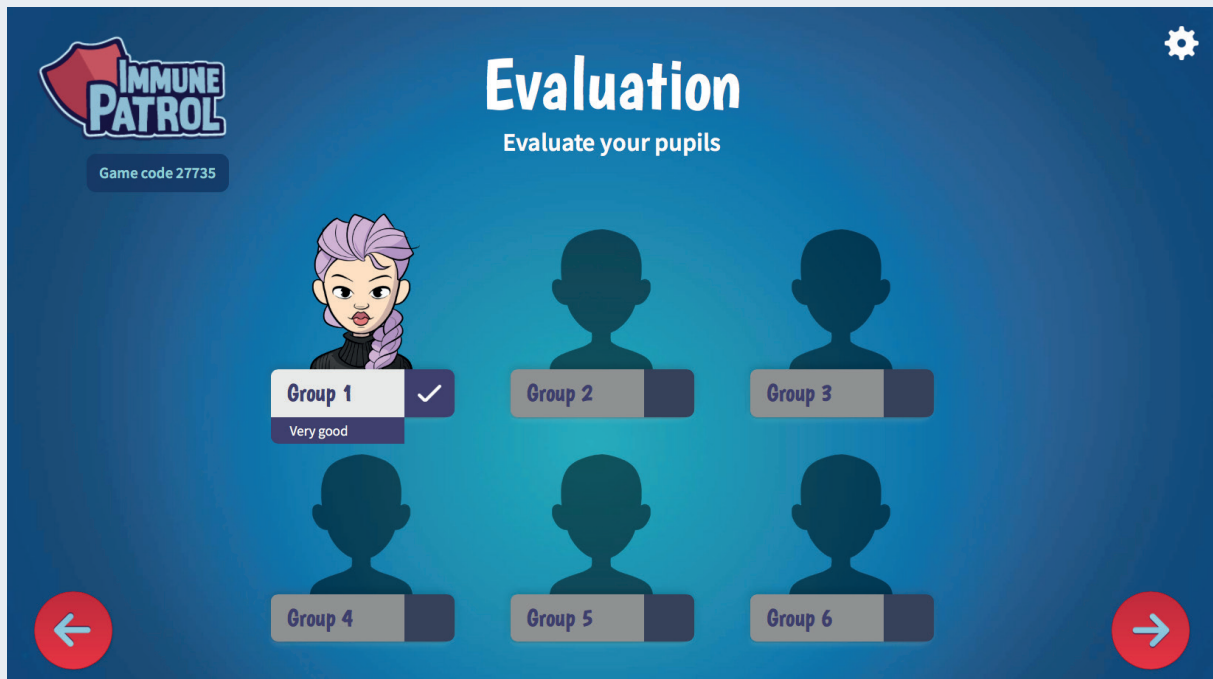
You can also choose to start a new game at any time. However, be aware that starting over deletes the present game and any progress your pupils have made in terms of their avatars.

To restart a game, click the cogwheel in the top right hand corner of the screen. The control panel will appear. Here you can restart the game or even delete your account.

Assessing pupils' performance

When your pupils have finished a lesson, their performance needs to be assessed. Assessing is the teacher's job. To enter your assessments, click the red arrow in the right-hand corner of the screen. You are now on the assessment page. Use the drop down menu to select one out of four options that describe how well your pupils managed the tasks.

Your assessment is translated into resources which the pupils can use to strengthen their avatar's immune system.





CHAPTER 5 - LESSONS STEP-BY-STEP

Once you have followed the instructions for starting a new game, you are ready to begin the game. But before you start Lesson 1, we recommend that you spend a little time preparing your pupils for what is to come. This is preferably done during the lesson before you start the game.

Lesson 0 - Pre-tasks

This is an optional lesson which should take no more than 45 minutes.

- 1.** To prepare the pupils for working with the immune system, we recommend that you start by asking them how much they know about diseases and how the body fights them. You might write down some of the answers and correct misconceptions, but the main idea behind this exercise is to tune the pupils into the subject rather than to teach them.
- 2.** Print and cut out the flash cards found at the end of this manual. Ask the pupils to sit in groups, and give each group a set of cards. Ask the groups to practise with the flash cards, taking turns at guessing the meaning of the scientific term.

Lesson 1 - Your body's defence

The pupils are asked to make either a three-dimensional model of a phagocyte, a t-cell or a b-cell, or an explanatory collage with pictures and facts.

To prepare for the lesson, you should make sure that the appropriate tools are available.

These could be:

- paper
- scissors
- crayons
- paint
- glue
- clay or plasticine
- pipe cleaners (if available)
- styrofoam balls of different sizes (if available)
- various other materials, such as pebbles, sticks, matches...

After the lesson, pupils will be able to explain:

- How the immune system works
- What the immune system does
- What the immune system consists of



Intended learning goals for scientific literacy:

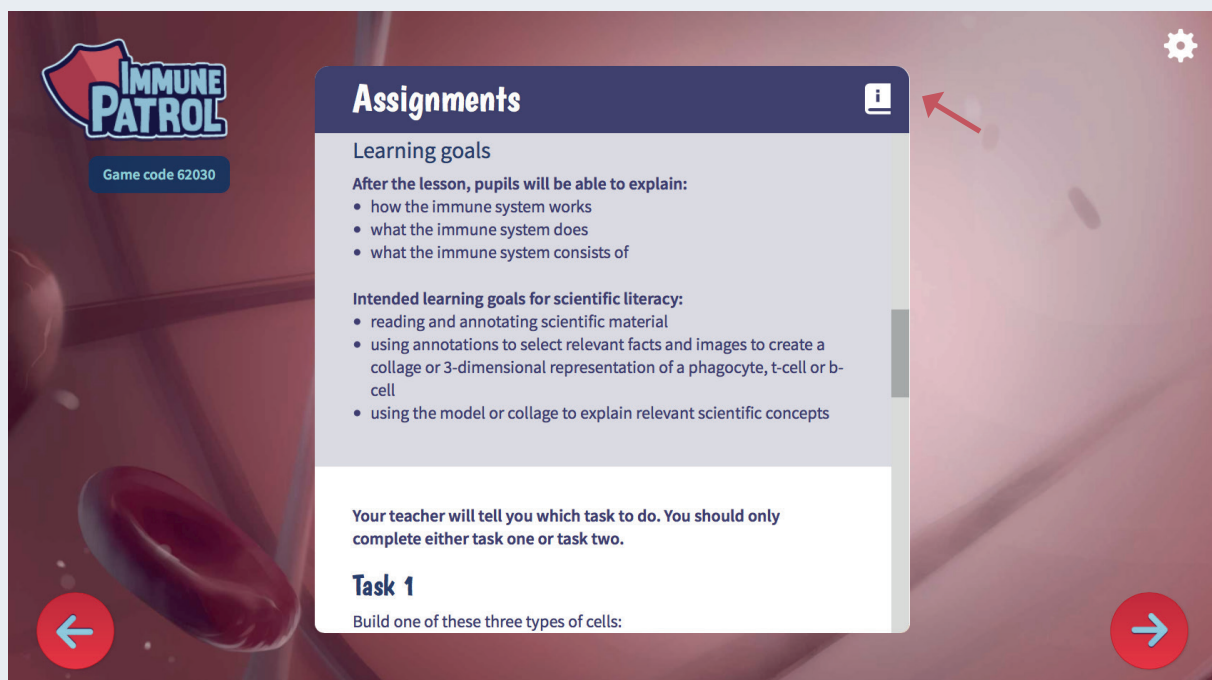
- Reading and annotating scientific material
- Using annotations to select relevant facts and images and create a collage or three-dimensional representation of a phagocyte, t-cell or b-cell
- Using the model or collage to explain relevant scientific concepts

Description of the lesson

When you open the lesson, the helper-cell TC introduces the pupils to the game. Click the “next-button” to go to the next step.

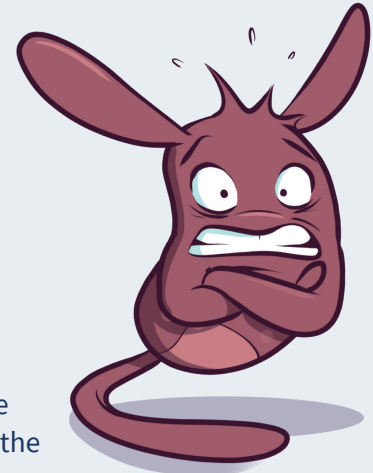
Once you have finished reading TC’s instructions, watch the video at the top of the page together with your pupils. Then scroll down to read the instructions.

At any point, you can access the mini encyclopedia (located in the assignment header) to read about the concepts that are introduced in the lesson.



Each group takes turns presenting its model or collage. The group is assessed by the teacher (see the chapter on assessment for a description of this step.)

While your pupils are battling against attacking diseases, a red icon will appear next to the avatar’s picture. It is recommended that you observe your pupils while they are playing. When the pupils finish playing the Battle game, a check mark appears. When all avatars have check marks next to them, you are ready to move on. End the lesson by comparing how ill each group’s avatar got.



Lesson 2 - Outbreaks!

The pupils are asked to write a story about an outbreak that takes place in a school. The outbreak can be a real disease which the pupils find in the mini-encyclopedia, or it can be a made-up disease.

The pupils work cooperatively on writing the story, each taking turns at the keyboard.

At the end of the lesson, each group should read the story aloud in front of the class (or the teacher can read aloud if preferred).

After the lesson, pupils will be able to:

- Understand how diseases are transmitted (transmission and incubation period)
- Understand the causes of an outbreak
- Envision a disease outbreak and its consequences.

Intended learning goals for scientific literacy:

- Using scientific knowledge to explain how their story does or does not represent the real-world consequences of an outbreak;
- Using scenario competency to envision the consequences of an outbreak.

Beskrivelse af kapitlet

Read TC's comments aloud to the class, and then watch the video. When you are done, ask the pupils to click the button "Go to Story Maker".

Ask the pupils to fill out the blank spaces in Story Maker, and submit their answers. This will auto-generate a text which they have to finish. Pupils are free to edit or delete the text, but it is intended to get them started on their story.



IMMUNE PATROL

Game code 29047

Story Maker

Fill in the boxes below to get your story

What is the name of your favourite teacher?

Is your teacher male or female?

☐ ♂ ☐ ♀ ☒ ♂♀

What disease breaks out? ▼

Create story

IMMUNE PATROL

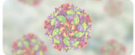

Game code 29047

Story Maker

Outbreak!

The first case I heard of was Boom. She was teaching English to a bunch of 4th graders when suddenly she went all quiet. "Excuse me. I don't feel so well", she said. Then she sat down. Her pupils didn't know what to do. It all felt a bit weird. Some at the back started throwing rubbers at each other. It escalated, and suddenly the whole class was screaming and throwing stuff. Boom, who was otherwise known to be quite strict, just got up and left. The next thing we heard, she had been taken to the hospital.

Choose picture

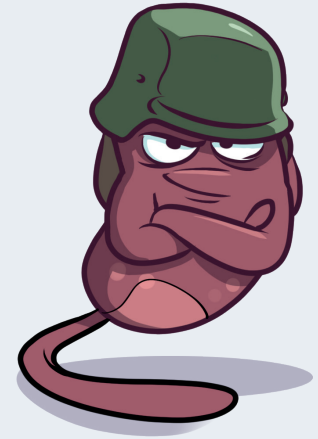
Done

The stories should be short enough that it takes no more than 5 minutes to read them aloud. Once the pupils' performance is assessed, clicking the red button will take your pupils to the Battle game, and they will once again have to fight against attacking diseases.



Lesson 3 - Fighting back

The pupils are asked to make and perform a small play in which they dramatize a vaccination. The play must show both what happens within and outside the body (for example “at the doctor’s office”).



After the lesson, the pupils will be able to explain:

- How to get a vaccine
- How a vaccine works
- What a vaccine consists of

Intended learning goals for scientific literacy:

- Annotating and organizing relevant scientific information about vaccination from a digital source (“screen reading”)
- Re-organizing knowledge into a play of 2-3 minutes’ duration

Description of the lesson

Start the lesson by reading what TC has to say, and then watch the video.

Ask the pupils to read the articles about vaccination in the mini-encyclopedia.

Once they are done reading, each group should start working on their small play.

After they have all performed their plays, move on to the assessment page, and then ask the pupils to play the Battle game.



Lesson 4 - Protecting each other

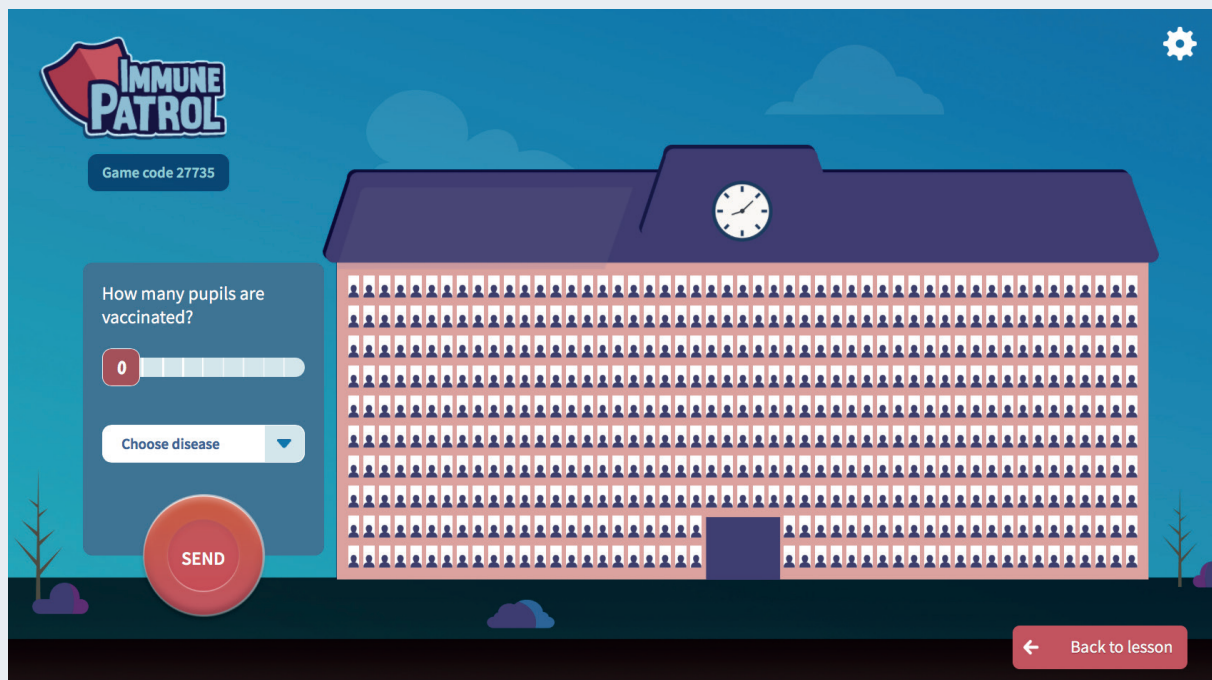
In this lesson, the pupils are asked to play the digital simulation game “Infection school”. The objective of this lesson is to teach pupils to make a thesis (here in the form of a list which indicates the infectiousness of the six diseases) and to test its validity. A second objective is for the pupils to learn how herd immunity works - that vaccinating the many protects the few.

After the lesson, pupils will be able to:

- Explain why vaccines are developed
- Explain herd immunity and how it works
- Explain why getting a vaccine is better than being infected by an infectious disease

Intended learning goals for scientific literacy:

- Collect data with the tool Infection school
- Make own observations about herd immunity, based on data





Description of the lesson

Read TCs instructions and watch the video. Then ask the pupils to read about six infectious diseases, herd immunity and benefits of vaccination in the mini-encyclopedia.

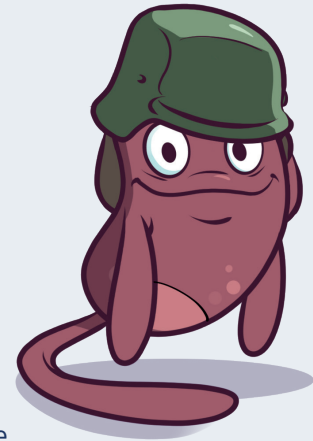
Based on the information in the mini-encyclopedia, the pupils should estimate for each of the six diseases how infectious they are by ranking them from 1-6 (1 being most infectious and 6 being least infectious). The pupils should test their thesis (list of diseases) in the digital game “Infection School”.

After this the pupils have to find out for each of the six diseases how many in a school of 500 would need to be immunized to make sure that the disease cannot spread (that is: to achieve herd immunity).

After the pupils have finished the two tasks you should facilitate a plenary discussion and ask about their findings.

After the plenary discussion, move on to the assessment page, and then ask the pupils to play the Battle game.





Lesson 5 - Making weapons

For the first task in this lesson, pupils play a game that shows them the different steps involved in making a vaccine. During the second half of the lesson, the pupils make a presentation about the new vaccine to a national board of specialists.

After the lesson, pupils will be able to:

- Explain the steps from development to use of a vaccine

Intended learning goals for scientific literacy:

- Arguing and preparing a presentation on the benefits of vaccines

Description of the lesson

Read TCs instructions and watch the video.

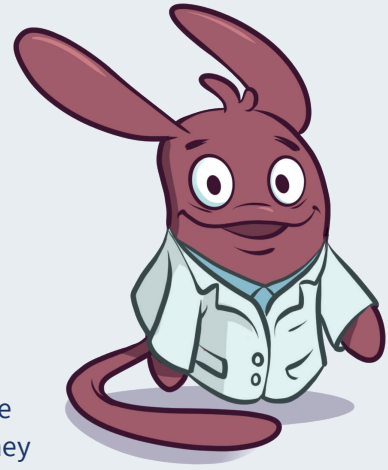
Then ask the pupils to go to the game “Vaccination Builder”. Once there, they should follow the instructions. Make sure that they read the descriptions and make educated guesses rather than just clicking randomly.

Once a group has finished the vaccination builder game, they are ready to move on to the next task. The groups can prepare their presentations on their computers or on paper.

When the groups present, they do so as vaccination experts. As their teacher, you are playing the part of the chairman of the national board of specialists in your country.

Once the pupils have finished their presentations, move on to the assessment page and then ask the pupils to play the Battle game.





Lesson 6 - Gettin' smarter

In this lesson, pupils are asked to assess different sources that make claims about vaccines. They are introduced to different strategies they can use to establish the validity of the source.

After the lesson, pupils will be able to:

- Critically discuss which sources are the most trustworthy
- Argue why an argument is valid.

Intended learning goals for scientific literacy:

- Becoming aware of tools and methods for applying source criticism to scientific texts.

Description of the lesson

Read TC's instructions and watch the video.

In this lesson pupils are asked to rank different sources and arguments. What is important is not the ranking as such, but more the pupils' ability to argue for their choices. Make sure you stress this to the pupils. When the pupils are working on ranking the trustworthiness of written texts, you should ask the pupils to pinpoint exactly where in the text they see that it is trustworthy or not.

The pupils' ability to argue for their choices should be reflected in your assessment of the group's performance.

Each group presents their list in front of the class. Make sure they explain their choices.

When the groups have finished presenting, move on to the assessment page and then ask the pupils to play the Battle game.

Virus

◀ Fold her ▶

**Tiny particle that can creep
into your body and attach
itself to your body's cells
and makes you sick.**

Immune system

◀ Fold her ▶

**The body's army of
cells fighting viruses
and bacteria**

Bacteria

◀ Fold her ▶

**Tiny organisms. Some are
good and live inside your body.
Others can sneak in and
make you sick.**

Infection

◀ Fold her ▶

**When a virus or bacteria
invades your body and your
body tries to fight it.**

Vaccination

◀ Fold her ▶

When you get an injection or drops that teach your immune system how to fight dangerous viruses or bacteria.

Cells

◀ Fold her ▶

**The building blocks your
entire body is made of.**

Immune

◀ Fold her ▶

**When you are protected
against a virus or bacteria.**

Infectious diseases

◀ Fold her ▶

**Diseases caused by
bacteria or viruses which
can be spread from one
person to another.**