



HIV: Transmission and the Immune System

The aim of the lesson is to provide information about how HIV is transmitted between people, and how HIV affects the immune system.

See our [Teachers Information Pack](#) for a comprehensive guide to HIV and AIDS so that you have all the information you need.

Target Audience: 11 – 14 years.

Curriculum areas: Physical Science, Biology, Life Orientation, Citizenship

Duration: 45 mins

Learning outcomes

By the end of the lesson students will:

- Know the different ways that you can and cannot get HIV
- Discuss strategies to prevent the spread of HIV
- Understand how HIV affects the immune system

Additional notes on this lesson

For this lesson you will also need the following materials:

- 0.1 mol/l sodium hydroxide solutions (1 teaspoon of caustic soda to 1 litre of tap water)
- Phenolphthalein indicator solution (1 drop; you could use a medicine dropper) or litmus paper or any other indicator
- 1 x 200ml beaker glass or other small glass container like a bottle or cup per learner
- Tap water

(Note: You can get caustic soda from your local supermarket – it is used as a sink cleaner and is very cheap. Most school laboratories have phenolphthalein. It is commonly used to test levels of acidity and alkalinity)

Before you start the lesson, prepare the solutions in each glass container for your class, with instructions as given below.

Preparation:

- Fill all containers, except one with water. The water should be 1/3 of each container.
- Fill one container with the caustic soda solution. This container should also be 1/3 full.





- Each student is given a container. Make sure that the learner with the caustic soda solution is part of group C. This learner should be a self-assertive and persuasive person who will be able to exchange fluids with many other learners. Nobody should know who this person is (the 'positive person'), not even the person himself. If the question arises later in the activity, discuss the issue **without** revealing who the learner was.

Lesson Plan

Timing	Activity	Materials
Introduction (5 mins)	There are many misconceptions about how HIV is spread and this can lead to harmful myths. The following activities will look at different ways to explain exactly how transmission takes place and to correct any misconceptions.	Read the <u>online resources</u> prior to class or print out the <u>Teachers' Information Pack</u>
Instructions (5 mins)	<p>Divide the class into three smaller groups, A, B, and C. Give each group its instructions. Tell the group they are at a party. Give each student their instructions written out on paper. Each student should only know their own group - don't let the students know what group the other students are in.</p> <p>Group A instructions: This group is made up of 3 learners Exchange fluids only with one person (say no to everybody else). Try to prevent that person from exchanging fluids with anybody else. You may exchange fluids with this person as often as you like.</p>	





	<p>Group B instructions: This group is made up of 5 learners Always say “NO” if somebody wants to exchange fluids with you.</p> <p>Group C instructions: The rest of the class Exchange fluids as often as you want with anybody. If somebody does not want to exchange fluids, see if you can persuade him/her. Your aim is to exchange fluids with as many people as possible, as often as possible.</p>	
<p>Group Work (15 mins)</p>	<p>Explain to the class that they are at a party and each have their glass – with instructions. Make sure they understand the instructions.</p> <p>Tell the class to move around and share the fluids in their glass according to their instructions. When they exchange fluids, the first person must pour all the contents of his glass into the other person’s and then the other pours half the liquid back into their container – both are then left with the same amount of fluid.</p> <p>Make sure that they all understand that exchanging fluids refers to pouring the liquid into someone else’s glass and does definitely not mean drinking any of the liquid as it contains chemicals, which are harmful. Do not spill fluid.</p>	





	<p>Give them 5 – 10 minutes to do this. Remind them not to reveal their instructions during the activity.</p> <p>Stop the activity and ask them what they think the activity was about. Usually the ones who had to say “NO” find it boring; the ones who exchange a lot will find it fun. Now tell them that the activity looked at how a virus like HIV is transmitted through unprotected sex – every time they exchanged fluids, was a chance for the virus to be transmitted.</p> <p>Now tell them that one person in the class was HIV positive – do not reveal who this person was, not even to the person.</p> <p>Explain that they are now going to be “tested”. The test uses the phenolphthalein solution. Put 2-3 drops in each learner’s glass. Learners who are “infected” will see a red dye in their solutions due to the reaction between the phenolphthalein and caustic soda. Count how many glasses have remained clear and how many have turned red.</p> <p>Remind the learners that at the beginning of the activity only one container did not contain pure water. The solutions in this container “infected” all the others that turned red during the test.</p>	
Group Discussion	Discussion: After all the learners	Discussion





<p>(5 minutes)</p>	<p>have been “tested”, lead a class discussion using the following questions.</p> <ul style="list-style-type: none"> • What does this experiment illustrate? • What possible solutions/strategies can be put in place to ensure that people do not become infected? 	<p>can be done in smaller groups and then each group can feed back to the class.</p>
<p>Activity 2 (10 mins)</p>	<p>Explain that the immune system is the body’s natural defence system. It is made up of white blood cells, which over take and destroy germs.</p> <p>Explain that when a person becomes infected with HIV the virus attacks that person’s immune system and destroys these white blood cells until the body can no longer fight off infections. Infections which take advantage of the weakened immune system are called Opportunistic Infections.</p> <p>Ask students to complete the immune system worksheet.</p>	<p>Immune system worksheet</p>
<p>Assessment for learning/Checking understanding</p>	<p>Transmission worksheet: This activity can be used to test students knowledge and understanding of how HIV is transmitted. It can also be given as a homework assignment.</p> <p>Immune system worksheet</p>	<p>Transmission worksheet</p>
<p>Suggested homework</p>	<p>You could ask students to go to their local clinic and find out how</p>	





activities	testing is done there. <i>Or</i> Ask students to do further research on the transmission of HIV specifically focusing on what happens in the body when a person becomes infected.	
Differentiation	Support less able learners by demonstrating the activity instead of getting them to actually move around and share the fluid. Challenge more able learners by asking them to investigate more into the immune system and how HIV affects it. The transmissions exercise is not suitable for learners with SEN , especially those with Autistic Spectrum Disorder. Many of these students will find this exercise too complex and confusing. Instead ask these students to work through the resources on Rafi.ki and then complete the quiz and the immune system worksheet. Support them individually as necessary.	

Source: Activity 1 has been adapted and supplied by eMPathy Trust-Southern Africa
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Worksheet – Transmission of HIV

Teacher's copy

Behaviour/Activity	True or false
HIV can be spread by shaking hands	False
HIV can be passed on to another person during sex	True
A pregnant woman who is HIV-positive can pass HIV onto her baby	True
A person can get HIV by donating blood	False
It is possible to get HIV from a toilet seat	False
HIV is spread by kissing	False
HIV is carried in the blood	True
Drug users can pass HIV to other drug users if they share needles	True
Only men can become infected by HIV	False
You should avoid touching someone who has HIV&AIDS	False
It is risky to drink from the same tap or cup as a person who has HIV&AIDS	False
If you are strong and healthy you cannot get HIV	False
You can tell by looking at someone whether that person has HIV	False
You are safe from HIV if you use the same condom more than once	False
The risk of getting HIV increases if you have many sexual partners	True
It is OK to share bedding and dishes with someone who is HIV-positive or has AIDS	True
Young people are at risk of getting HIV	True
It is OK to share razors with someone who has HIV&AIDS	False
During menstruation the risk of getting HIV through unprotected sex is higher	True





Worksheet – Transmission of HIV

Student copy

Behaviour/Activity	True or false
HIV can be spread by shaking hands	
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Worksheet – The Immune System

Teacher's copy

Just as a country spends lots of money each year keeping our army ready for war, so does the body constantly maintain its own defence system. The immune system can __ **defend** __ us from invading bacteria, viruses and diseases, if we supply it with the proper weapons.

The immune system consists of soldiers called __ **white blood** __ cells. These are found in the blood and all over the __ **body** __.

The soldiers get their strength and weapons from the nutrients in the food that we eat. Eating the right healthy foods means that our __ **soldiers** __ can continue to defend our bodies from attack.

A body cannot protect or __ **heal** __ itself with a diet of nutrient – low or __ **unhealthy** __ foods because it leaves the door open for diseases and infections to come in, resulting in __ **illness** __. When we become ill our __ **immune** __ system needs to work extra hard and uses more nutrients from the food we eat. These very special soldiers need lots of help from us to do their job properly and make us better.

Lots of natural medicines are based on foods which contain __ **vitamins** __ and minerals that help to build our immune system. It is important that these vitamins and minerals are in our __ **diets** __ every day.

MISSING WORDS

defend	body	diets	illness	white blood
heal	soldiers	vitamins	unhealthy	immune





Worksheet – The Immune System

Student's copy

Fill in the gaps using the words below:

Just as a country spends lots of money each year keeping our army ready for war, so does the body constantly maintain its own defense system. The immune system can _____ us from invaders in the form of bacteria, viruses and diseases, if we supply it with the proper weapons.

The immune system consists of soldiers called _____ cells. These are found in the blood and all over the _____. These soldiers get their strength and weapons from the nutrients in the food that we eat.

Eating the right healthy foods means that our _____ can continue to defend our bodies from attack.

A body cannot protect or _____ itself when fed a diet of nutrient-low or _____ foods because it leaves the door open for diseases and infections to come in, resulting in _____.

When we become ill our _____ system works extra hard and uses more nutrients from the food we eat. These very special soldiers need lots of help from us to do their job properly and make us better.

Lots of natural medicines are based on natural foods and the _____ and minerals that help to build our immune system. It is important that these vitamins and minerals are in our _____ every day.

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