

## National 3- Multicellular Organisms Revision

**Key Area 1: Structure and function of organs and organ systems and their role in sustaining life.**

**What you must know:**

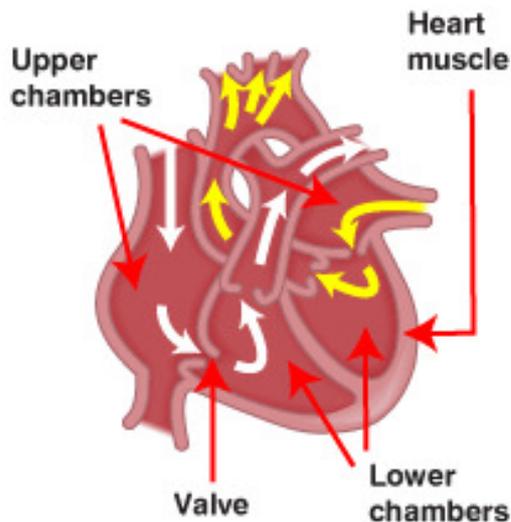
- **The basic structure and functions of main organs and systems of the body, such as the role of the heart, lungs or digestive system and their role in sustaining life.**

### THE HEART

Your heart is a very strong **muscle** that **pumps blood around your body**.

It is made of **four** chambers.

Blood enters the upper chambers. These squeeze and push the blood into the lower chambers, which then squeeze and push the blood out of your heart.

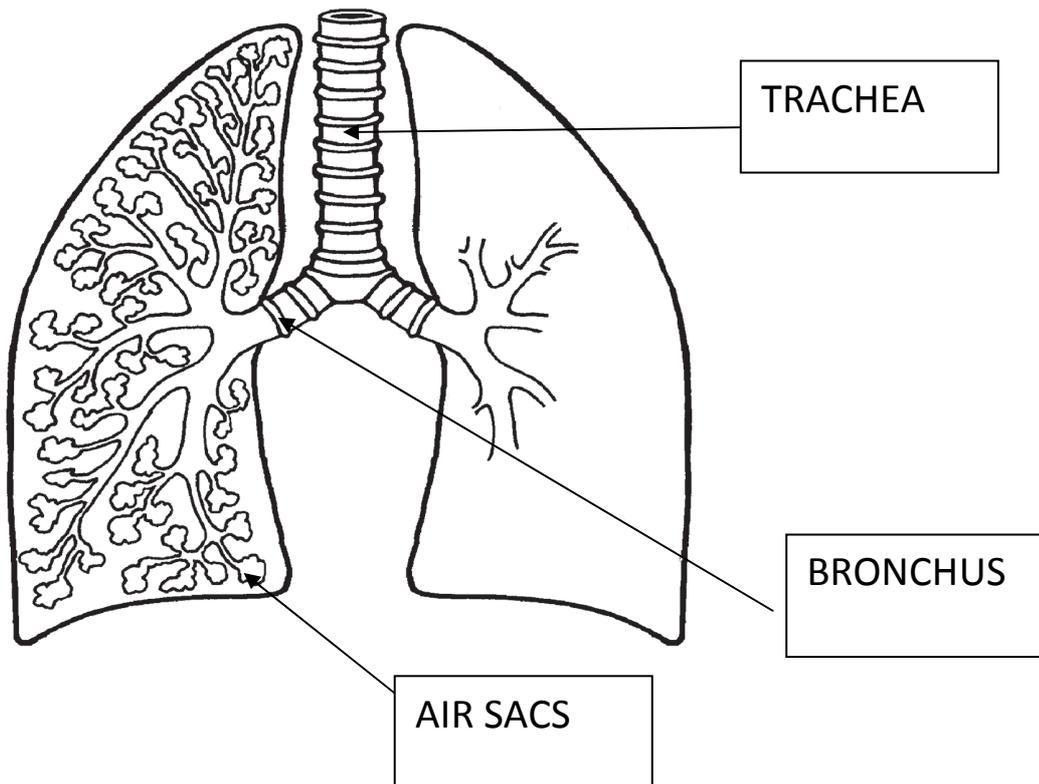


Part of a healthy lifestyle includes keeping your heart healthy. This can be done by getting enough **exercise** and eating a **healthy diet**.

## THE LUNGS AND BREATHING

Our lungs are inside our rib cage and at either side of the heart. They are pink and spongy as they are made up of millions of air sacs.

The lungs **take in oxygen** and give it to the blood. They also **remove carbon dioxide** from the blood and breathe it out.



## THE DIGESTIVE SYSTEM



The job of your digestive system is to break down the food that you eat into useful molecules.

These molecules help you grow, give you energy and help your body function properly.

**Key Area 2: Role of technology in monitoring health and improving quality of life.**

Measurement	How to Measure
Temperature	Thermometer
Body Fat	Skin fold Callipers
Blood Pressure	sphygmomanometer
Pulse/ heart rate	Pulsometer/ heart rate monitor/ finger & stopwatch
Fitness of Lungs	Peak flow

Peak flow - is the maximum rate we breathe air out of our lungs. This is used to diagnose asthma. A peak flow meter measures peak flow.



Fat can be measured using skin callipers. They measure the thickness of a fold of skin with its layer of fat underneath it. Body fat should be 20%. Measurements are normally taken at the top of the arm, back and waist.

Our body temperature has always to be between 36°C and 37°C. Our body temperature can be slightly different at various times of the day and where it is measured e.g. in the ear, under the tongue or under the armpit.



Body temperature above 40°C can lead to heat stroke or show a fever from fighting infection. Body temperature below 35°C can show hypothermia. If the temperature of the body falls below 30°C, death occurs. Babies and elderly people are most at risk from hypothermia.



We can look at our blood and tell if someone is ill or has a disease. Blood tests and blood counts are used to detect many things. Leukemia is a disease which is detected by a high number of white blood cells. Diabetes is a disease which shows that you have too much sugar in your blood or urine.

Blood pressure is the pressure of our blood in our arteries. This pressure is caused by the pumping action of our heart. Blood pressure is measured using a digital sphygmomanometer or with a stethoscope. A high blood pressure is an indicator of heart disease.



We can find out how healthy we are by measuring our resting pulse rate. This is our pulse rate when we are not exercising and tells us how efficient our heart and circulation are. Normal pulse rate is between 60 and 80 beats per minute.



### Key Area 3: Body defences against disease and role of vaccines.

#### What you must know:

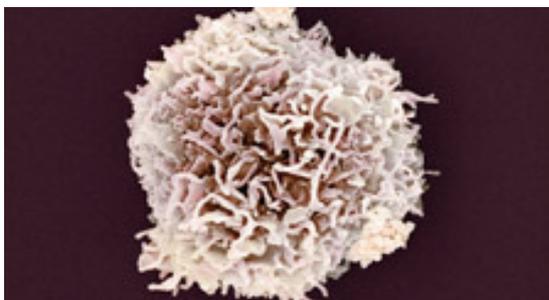
- Skin, tears and mucus help to prevent infection. Some white blood cells produce antibodies in response to an infection and vaccinations can provide immunity to disease.

### NATURAL BARRIERS

The body has natural barriers to stop harmful microbes getting inside the body. Here are some of them:

- **acid** in the stomach kills many microbes
- sticky **mucus** in the lungs traps microbes, and then cilia sweep it out of the lungs
- the **skin** stops microbes from getting into the body
- **scabs** form on the skin if you get a cut, stopping microbes from getting into your body
- **tears** contain substances that kill bacteria.

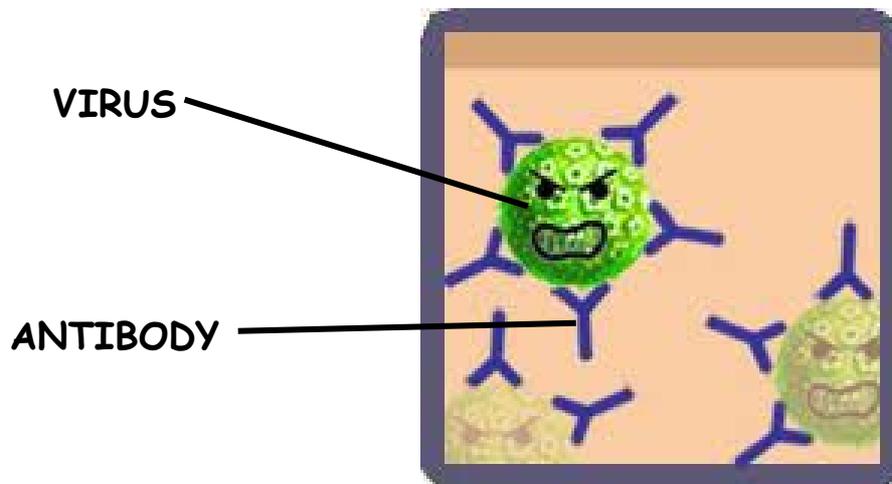
### THE IMMUNE SYSTEM



The body has an immune system that kills microbes if they get past the natural barriers. White blood cells are very important in the immune system. There are different sorts of these cells, but they can do two main jobs.

Some white blood cells can engulf microbes and kill them.

Some white blood cells can make substances called **antibodies** in response to an infection that stick to microbes and destroy them.



### IMMUNISATION

When you are infected by a microbe, it takes time for your body to start fighting the infection. It does this by making enough white blood cells with the correct antibody. During this time, you continue to feel unwell.



You begin to recover when enough antibodies have been produced. After the microbes have been killed, the amount of antibodies goes down again. But some of the white blood cells that produce the correct antibody remain in your blood.



After a second infection by the same microbe, your body makes the correct antibodies much faster, because of the white blood cells that remain from when you had the first infection. The microbe doesn't get a chance to make you ill this time, and we say that you are immune to the microbe and the disease it causes.

## VACCINATION

Immunisation is a process that doctors use to make people immune from certain illnesses, even before they have been infected. It involves you receiving an **injection containing a vaccine**.

Vaccines contain a **dead or weak** form of the disease-causing microbe, or some of its antigens. In response to the vaccine your immune system produces white blood cells with the correct antibody to kill the microbe, so you become immune without falling ill.

You are likely to have been immunised against several microbes, viruses and bacteria, including the ones that cause diphtheria, whooping cough, polio, and tetanus .Vaccination works against diseases caused by both bacteria and viruses.



## Key Area 4: Fertilisation, embryonic development and risks to embryo.

What you must know:

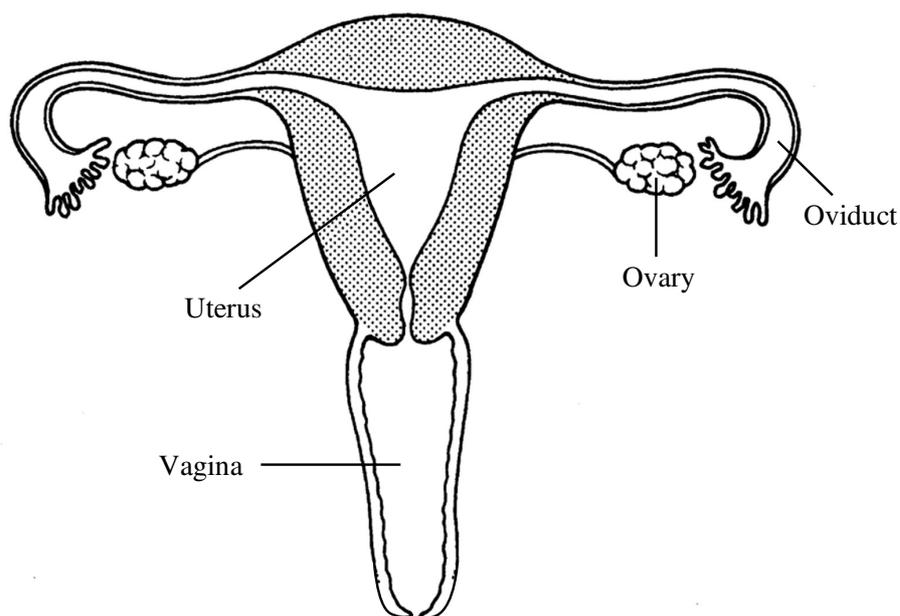
- Fertilisation is the fusion of sex cells. The fertilised egg develops into an embryo then a foetus.
- Drugs such as alcohol and tobacco can harm human foetal development.

### FERTILISATION

Sperm cells travel in semen from the penis and into the top of the vagina. They enter the uterus through the cervix and travel to the **oviduct** (egg tubes.) If a sperm cell meets with an egg cell there, fertilisation can happen.

Fertilisation happens when an egg cell fuses (joins) with a sperm cell.

The fertilised egg divides to form a ball of cells called an embryo. This attaches to the lining of the **uterus** and begins to develop into a foetus and finally a baby.



## FOETAL DEVELOPMENT

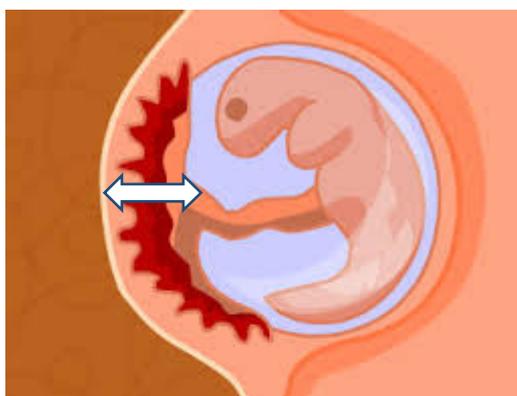
The foetus relies upon its mother as it develops. Some of the things it needs are protection, oxygen and nutrients (food and water).

### Risks to Foetal Development

#### **ALCOHOL CONSUMPTION**

Researchers have known that heavy drinking during pregnancy can cause birth defects. <http://www.webmd.com/baby/tc/birth-defects-testing-what-are-birth-defects-tests>

**Fetal alcohol syndrome (FAS)** is a pattern of mental and physical defects that can develop in a fetus in association with high levels of alcohol consumption during pregnancy.



#### **SMOKING**

Smoking during pregnancy affects the baby's health before, during, and after the baby is born. The nicotine (the addictive substance in cigarettes), carbon monoxide, and numerous other poisons inhaled from a cigarette are carried through the bloodstream and go directly to the baby. Smoking while pregnant will:

- Lower the amount of oxygen available to mother and growing baby.
- Increase the baby's heart rate.
- Increase the chances of miscarriage and stillbirth.
- Increase the risk that the baby is born prematurely and/or born with low birth weight.

The more cigarettes smoked per day, the greater the baby's chances of developing these and other health problems. There is no "safe" level of smoking while pregnant.

## GLOSSARY

Complete the glossary for the following terms.

Term	Meaning
Thermometer	
Sphygmomanometer	
Peak flow	
Fever	
Natural Barriers	
Engulf	
Immunity	
Vaccine	
Fertilisation	
Foetus	
Foetal Development	
Defects	

