How do our bodies resist infection?
There are natural barriers to reduce the risk of harmful microorganisms entering the body (the skin, chemicals in tears, sweat and stomach acid).
In suitable conditions (such as inside the body) these microorganisms can reproduce rapidly.
Symptoms of a disease are caused by damage done to cells by the microorganisms or the poisons (toxins) they produce.
Our bodies have immune systems to defend themselves against the invading microorganisms. The immune system uses antigens on microorganisms to recognise them.
White blood cells can destroy microorganisms by engulfing and digesting them, or by producing antibodies.
A different antibody is needed to recognise each different type of microorganism because each one has a different antigen.
Once the body has made the antibody to recognise a particular microorganism it can make that antibody again very quickly, protecting against that particular microorganism.

What are vaccines and how do they work?
Microorganisms may enter the body and cause illness before the immune system can destroy them.
Vaccinations provide protection from microorganisms by creating antibodies before infection.
A vaccination contains a usually safe form of a disease-causing microorganism.
Vaccination can never be completely safe, since individuals have different degrees of side-effects from a vaccine.
To prevent epidemics of infectious diseases, it is necessary to vaccinate a high percentage of a population so that the infection cannot spread easily.
There is a conflict between a person's right to decide about vaccination for themselves or their children, as there is a benefit to society as a whole.
New vaccines against influenza have to be developed regularly because the virus changes its antigens very quickly.
It is difficult to develop an effective vaccine against the HIV virus (which causes AIDS) because the virus damages the immune system and has a high mutation rate. Mutations produce changes to its antigens.
Using an example of a vaccination policy make sure that you can say clearly what the issue is, summarise different views that may be held, distinguish what can be done (technical feasibility) from what should be done (values), explain why different courses of action may be taken in different social and economic contexts, identify, and develop, arguments based on the ideas that the right decision is the one which leads to the best outcome for the majority of people involved and that certain actions are never justified because they are unnatural or wrong.

What are antibiotics, and why can they become less effective?
We can kill bacteria and fungi, but not viruses, using chemicals called antibiotics.
Over a period of time bacteria and fungi may become resistant to antibiotics.
Random changes (mutations) in the genes of these microorganisms sometimes lead to varieties, which are less affected by the antibiotic.
To reduce antibiotic resistance we should only use antibiotics when necessary and always complete the course.

How are new drugs developed and tested?
New drugs are first tested for safety and effectiveness using human cells grown in the laboratory and animals.
Human trials may then be carried out on healthy volunteers to test for safety and on people with the illness to test for safety and effectiveness.
Make sure that you can describe and explain the use of 'blind' or 'double-blind' human trials in the testing of a new medical treatment.
Placebos are not commonly used in human trials because new treatments are usually compared with the current treatment. They are used if there is no current treatment to compare with the new drug.

B2.4 What factors increase the risk of heart disease?
Heart muscle cells need their own blood supply to supply heart muscle cells with oxygen.
Arteries have elastic, muscular walls to protect against and maintain high blood pressure.
Veins have valves and thinner walls because blood in them is at a much lower pressure.
Fatty deposits in the blood vessels supplying the heart muscle can produce a 'heart attack' when a poor oxygen supply damages part of the muscle.
Heart disease is usually caused by lifestyle factors and/or genetic factors, not microorganisms.
These lifestyle factors include poor diet, stress, cigarette smoking and excessive alcohol intake. They increase the risk of heart disease but do not always lead to it.
Heart disease is more common in the UK than in non-industrialised countries because many people have a high fat diet and exercise less.
Regular moderate exercise reduces the risk of developing heart disease.
Make sure that you can give an example from everyday life of a correlation between a factor and an outcome and explain why a correlation between a factor and an outcome does not necessarily mean that one causes the other. Be able to give an example to help you explain this e.g. smoking cigarettes increases the risk of heart disease but the heart disease is caused by the many chemicals in the tobacco.

How are links between factors and health investigated?
Factors that can increase the risk of heart disease are identified by epidemiological studies involving large numbers of people. Individual cases do not provide convincing evidence for or against a link.
Studies compare large amounts of data between groups that are matched in as many factors as possible.
You need to be able to evaluate the design for a study to test whether or not a factor is linked to a health problem, by commenting on sample size and how well the samples are matched.
Check that you can use data to develop an argument that a factor does or does not increase the chance of an outcome. Make sure that you know what a positive correlation would look like on a scatter graph.
Be able to identify the presence (or absence) of a scientific explanation as important for the acceptance (or rejection) of a claimed link causing a health problem.
The 'peer review' process is where other scientists who are experts in that field of science evaluate new scientific claims by studying the methods and results.
New scientific claims that have not yet been evaluated by the scientific community are less reliable than well-established ones.
A scientific claim may be questioned if other scientists have not replicated the results.